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ROYAL BOTANIC GARDENS, KEW

LVIII—AGAVE AMANIENSIS: A NEW FORM OF FIBRE-PRODUCING AGAVE FROM AMANI.

Mr. W. Nowell, Director of the East African Agricultural Research Station, Amani, recently drew the attention of Kew to an *Agave* in cultivation at Amani under the name *A. Lespinassei* Trelease. Mr. Nowell pointed out, however, that it did not agree with the original description of that species and specimens were accordingly sent to Professor Trelease, who considers it to be an undescribed form belonging to the *Zapupe* group. As it is possible that it may be of importance as a fibre-producing plant, it seems desirable to publish the following description, drawn up by Mr. Nowell and Professor Trelease, together with a photograph of the plant at Amani and notes on its history and fibre-producing qualities, kindly supplied by Mr. Nowell.

The taxonomic status and interrelationship of the various forms of cultivated Agaves are a matter of opinion, pending a genetical investigation of the group : meanwhile it seems convenient to follow previous practice in giving this new form specific rank under the name *Agave amaniensis*.

Agave amaniensis *Trelease et Nowell*, sp. nov. ; inter species gregis *Zapupe* foliorum marginibus inermibus spinis terminalibus basi conspicue aureo-zonatis distinguitur.

Habit erect, acaulescent, finally suckering rather freely. *Leaves* ensiform, rigid, leathery, ascending except the short basal ones which turn down, markedly glaucous on both sides (" greyish blue-green," Ridgeway, Pl. 48), giving a slatey-blue appearance from a distance, ground colour " deep, dull yellow-green " (Ridgeway, Pl. 32), length 140–160 (? 200) cm., width, at base 16 cm., at waist 10 cm., blade 15 cm., concave with margins incurved near the tip and nearly meeting below insertion of terminal spine ; margins entire or a few rudimentary spines near base ; translucent marginal line barely visible ; terminal spine " taupe brown " (Ridgeway, Pl. 44) minutely pitted, slightly spirally curved, 15 mm. long, 4 mm. diam. at base, hollowed on the upper side to a shallow triangular trough about 5 mm. long, slightly (about 5 mm.) decurrent, surrounded at the base by a conspicuous greenish-yellow border 2 mm. wide. Flowers and fruit unknown.

Cultivated (under the name *A. Lespinassei* Trelease) at the East African Agricultural Research Station, Amani, Tanganyika Territory. *Greenway* 2994 (type, in the U.S.A. National Herbarium).

History and Properties of A. amaniensis.

W. Nowell.

Although effort to trace the history of *Agave amaniensis* still continues its origin seems likely to remain obscure. The examples at present in cultivation are derived from a small group found almost buried in secondary growth of trees and shrubs in an abandoned section of the Amani Station near Sigi. My attention was first called to the length of leaf of these plants in comparison with ordinary sisal by Mr. F. M. Rogers, who as Head Gardener had charge of the Amani plantations for several years previous to reorganisation in 1927. Associated with the plants was a label of unknown date bearing the name *Agave Lespinassei*. With this species, as described by Professor Trelease, the plant definitely fails to agree, though it is to be noted that specimens of typical *Lespinassei* preserved in the Amani Herbarium from German times show that the species was once in cultivation at Amani. No living examples of it are now to be found. Information kindly supplied by Dr. K. Braun indicates that *A. Lespinassei* was introduced in January 1909 and again in May 1911, in both cases through the Botanic Garden at Berlin-Dahlem. To the record of the second introduction is attached the note " Zapupe de Tepezintla, Tampico." *Agave Zapupe* was also grown, from bulbils received from Professor Trelease in June 1909. The herbarium specimens of the last-mentioned species likewise agree with the original description and exhibit definite differences from the plant under notice. Dr. Braun informs me that the different *Agave* species were planted out near to the great rock Ilsenstein, which forms a prominent landmark on the Amani hillside, and a native foreman, who has been continuously employed here, adds the information that all were dug up at some unspecified date and transported to Kihuhui plantation where they apparently cannot be traced at the present time.

Neither the original plants of *A. amaniensis* nor their progeny have been observed to pole, and propagation so far has depended on the transplanting of suckers, which are produced with considerable freedom after two years of growth. Observations of the species have mainly been made on a plot established in sandy soil in an open situation at Sigi (1400 feet) planted in December 1929. Other plots, now two years old, each established from about 400 suckers, are in existence on commercial estates at Magunga, near Korogwe (Messrs. Bird & Co.) and Amboni, near Tanga (Amboni Estates Ltd.). A few plants have been grown at Amani at an elevation of about 2750 feet. In all cases the vegetative development is markedly superior to that of *Agave sisalana* as regards both rapidity of growth and size of leaf attained. It seems certain that a gain of six to twelve months will be generally made in the date of the first cutting, and appearances suggest that an increased rate of production will be maintained. Mature leaves on the three-year-old plot at Sigi have an average

PLATE XVII

Agave amaniensis growing at Amani. Planted December, 1929. Photographed September, 1932.

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length of 150 cm. It remains to be seen how long the plants will take to pole.

No reliable figures of comparative weights of fibre produced are yet available but the indications are that the percentage of fibre will be somewhat lower than that of sisal. The number of fibres per leaf on the other hand is much greater. Sample counts made on cross sections of the leaves have given the figures 2210 and 1080 respectively. It follows that the fibre of *Agave amaniensis* is much the finer and this is immediately evident on comparing extracted samples. The average tensile strength of sisal fibres is greater owing to their much greater thickness but when calculated to equal cross sectional area the fibre of *A. amaniensis* has about 1½ times the tensile strength of sisal. It has a very notable advantage in length; fibre from Sigi runs from four to five and half feet. The brushed fibre is lustrous, white to creamy-white in colour, with a pleasant soft texture.

The characters described above are in very close accord with those claimed for the Zapupe group of Mexican Agaves in articles which went the round of the world's journals interested in tropical agriculture during 1906 and the two following years. *A. amaniensis*, while it reproduces the desirable characters claimed for the Zapupe group, has a great practical advantage in the complete absence of the strong marginal spines characteristic of *A. Lespinassei* and its associates.

LIX—TROPICAL AFRICAN PLANTS: XI.*

Rinorea Dawei (*Sprague*) *Bullock*, comb. nov. [Violaceae]; *Alsodeia Dawei* Sprague in Journ. Linn. Soc., Bot. **37**, 497 (1906).

Psilotrichum filiforme *E. A. Bruce*, sp. nov. [Amaranthaceae]; affinis *P. gracilento* C. B. Cl. sed gracilior et ramosissima, inflorescentiis brevioribus, floribus minoribus differt.

Herba gracilis, erecta, ramosissima, glabra, 15–25 cm. alta; caules maturi saepe prominenter sulcati, internodiis inferne brevibus superne elongatis (1–4 cm. longis), ramulis brevissimis foliatis in axillis foliorum dispositis. *Folia* lineari-filiformia, 1–2·5 cm. longa. *Inflorescentia* spicata, spicis plerumque terminalibus usque ad 1 cm. longis sed plerumque minoribus, pedunculis gracilibus usque ad 5 cm. longis. *Bracteae* lanceolatae, valde persistentes, demum patentes et leviter arcuatae, circiter 1 mm. longae. *Flores* solitarii, pedicellis bibracteolatis, bracteolis linearibus minutis. *Perianthii* segmenta 5, alba, oblongo-lanceolata, circiter 1 mm. longa, apice subacuta. *Stamina* 5, antheris pro rata magnis, filamentis brevibus complanatis basin versus latioribus; staminodia absunt. *Ovarium* ovoideum, stylo simplice lineari.

TANGANYIKA TERRITORY: Tabora District; Shinyanga, 3600 ft., in grey sandy soil in seasonal marsh, *B. D. Burtt* 2440 (type). Old

*Continued from *K.B.* 1933, 151.

Shinyanga, Seke Road, 3800 ft., in a marshy *Lannea* glade with *Microchloa indica*, *B. D. Burtt* 3724. Mwanza District; Mwanza, *R. L. Davis* 235.

Buchnerodendron stipulatum (*Oliv.*) *Bullock*, comb. nov. [Flacourtiaceae];—*Oncoba stipulata* Oliv. in Trans. Linn. Soc., Bot. **29**, 31 (1872).

Euphorbia imbricata *E. A. Bruce*, sp. nov. [Euphorbiaceae]; affinis *E. Petitianae* A. Rich. sed margine foliorum integro leviter involuto differt.

Herba perennis, erecta, glabra, radice lignosa, caulibus costatis circiter 2 mm. crassis. *Folia* alterna, inferiora remota, superiora imbricata, sessilia, glabra, 0·8–1·3 cm. longa, 0·4–0·8 cm. lata, oblanceolata, apice obtusa sed mucronata, basi rotundata vel late cuneata, costa media prominente, margine integro leviter involuto. *Stipulae* non visae. *Umbella* terminalis, circiter 3 cm. diametro, radiis 4 bifidis circiter 3·5 cm. longis glabris. *Bracteae* involucri 2, orbiculatae, purpureo-tinctae, apice truncatae vel leviter emarginatae, valde apiculatae. *Glandulae* involucri 4, intra ciliatae, lobis 4 lanceolatis margine dentato alternis. *Capsula* non visa.

Tanganyika Territory: Rungwe District; Elton Plateau, 9000 ft., flower greenish with purple tinge, found in grassland, *R. M. Davies* E. 17 (type).

Zimmermannia ovata *E. A. Bruce*, sp. nov. [Euphorbiaceae]; affinis *Z. capilliped* Pax sed foliis minoribus basi rotundatis differt.

Frutex parvus, gracilis, ramulis junioribus viridibus glabris, maturis pallide ferrugineis leviter lenticellatis. *Folia* petiolata, petiolis 0·5–1·0 cm. longis glabris: lamina ovata, membranacea, glabra, 4–8 cm. longa, 2·5–5·0 cm. lata, apice acuta vel sensim acuminata, basi late rotundata, margine integra: nervi laterales utrinsecus circiter 6, ascendentes, arcuati. *Stipulae* mox deciduae, foliaceae, glabrae, late ovatae, circiter 1 cm. longae et latae, basi cordatae, apice acutae vel breviter acuminatae. *Flores* monoici, rosei, solitarii vel fasciculati in axillis foliorum dispositi; flores ♂ pedicellati, pedicellis 5 mm. longis, sepalis 5 valde imbricatis 4 mm. longis orbicularibus apice obtusis margine minute ciliatis, staminibus 5, antheris magnis ellipsoideis sessilibus vel subsessilibus e disco ortis et ovarii rudimentum circumdantibus, disco subintegro verruculoso crasso ultra antheras producto. *Flores* ♀ longe pedicellati, pedicellis circiter 3 cm. longis, sepalis 5 imbricatis oblongo-obovatis apice rotundatis circiter 1·3 cm. longis et 1·0 cm. latis, ovario globoso-ovoideo circiter 5 mm. longo glabro, stylis 3 liberis ascendentibus integris, stigmatibus biglobosis, disco tenue et plano circiter 7 mm. diametro margine integro vel leviter undulato. *Capsula* rubro-brunnea, purpurea, in valvas 6, circiter 1·3 cm. longas fissa. *Semina* fusca, reniformia, circiter 6 mm. longa, foveolata.

Kenya Colony: Teita Hills, 4500 ft., in the undergrowth of Ngangao mist-forest, *Gardner* 2909 (type)!

This genus has previously only been recorded from Tanganyika Territory in the vicinity of Amani and is represented by *Z. capillipes* Pax. The discovery of a second species in the Teita Hills in South-East Kenya is therefore of interest.

Crotalaria (Simplicifoliae) vialis *Milne-Redhead*, sp. nov. [Papilionaceae] ; a *C. anthyllopsi* Welw. ex Bak. foliis supra glabris, floribus paucioribus majoribus, vexillis alisque saturate caeruleis differt.

Herba annua, circiter 25 cm. alta, ramosa, ramis erectis adscendentibus vel decumbentibus usque 30 cm. longis. *Caules* teretes vel leviter sulcati, leviter ferrugineo-hirsuti, vel apicem versus densius. *Folia* unifoliolata, petiolata, ovata vel lanceolata, obtusa vel subacuta, minute apiculata, basi rotundata, usque 6 cm. longa et 2·5 cm. lata vel 7 cm. longa et 2 cm. lata, supra glabra, costa leviter sulcata, subtus conspicue adpresse hirsuta, costa ferruginea conspicua ; petioli usque 8 mm. longi, densiuscule ferrugineo-hirsuti ; stipulae filiformes, usque 5 mm. longae, hirsutae, persistentes. *Racemi* terminales, usque 12-flori, breviusculi, usque 3 cm. longi ; bracteae stipulis similes, usque 3 mm. longae ; pedicelli usque 9 mm. longi cum rhachi dense hirsuti ; bracteolae bracteis similes. *Calyx* extra dense hirsutus, intus glaber ; tubus brevissimus, circiter 1 mm. longus ; segmenta postica oblongo-lanceolata, acuta, 1·5 mm. lata, 7 mm. longa ; lateralia lanceolata, subulata, basi 1·5 mm. lata ; antica lineari-subulata, breviuscula. *Vexillum* depresso-orbiculare, circiter 11 mm. altum ungue incluso, et 13 mm. latum, breviter unguiculatum, ungue recurvato margine ciliato, apice emarginatum, glabrum, caeruleum ; alae obovato-oblongae, circiter 11 mm. longae et 5 mm. latae, apice rotundatae, basi curvatae, unguiculatae, glabrae, caeruleae ; carina dorso rotundata, rostrata, 1 cm. diametro, basin versus breviter lobata, unguiculata, flavo-albida. *Stamina fertilia* antheris 1·5 mm. longis praedita ; stamina redacta similia sed antheris minimis. *Ovarium* stipitatum, 10–13-ovulatum, lineari-oblongum, circiter 3 mm. longum, margine postico hirsutum, stipite vix 2 mm. longo ; stylus 11 mm. longus, apicem versus postice minute pubescens. *Legumen* immaturum oblongo-ovoideum, sessile, 1·4 cm. longum, 0·8 cm. diametro, dense pilosum.

Tanganyika Territory : Iringa District : in moist sandy furrows of present and recent cultivation, and also on damp roadsides, at Iringa, 5300 ft., 17 March 1932, *Lynes* I.g. 223 (type) ; weed, flowers deep violet-blue with straw-coloured calyces. Mbeya District : common at Ipata, 4000 ft., 10 April 1932, *R. M. Davies* 573 ; herb, yellow flowers.

Chlamydocarya rostrata *Bullock*, sp. nov. [Icacinaceae] ; a *C. Thomsoniana* Baill. foliis maturis glabris abrupte acuminatis, corolla fructifera longiore minus dense pubescente differt.

Frutex alte scandens ; rami volubiles, ramulis primum dense adpresse ferrugineo-strigoso-pubescentibus demum glabrescentibus.

Folia matura utrinque glabra, integra, anguste obovata vel elliptica, vel obovato-oblanceolata, apice obtuse 2–2·5 cm. longe caudato-acuminata, basin versus cuneatim angustata, sed obtusa, usque 18·5 cm. longa et 7 cm. lata, nervis lateralibus arcuatis subtus prominentibus utrinque circiter 9; petioli circiter 5 mm. longi, primum cum ramulis pubescentes, mox glabri. *Inflorescentia* 2 cm. longa, spicata; flores masculi non visi; flores feminei 4-meri. *Calyx* fere ad basin lobatus, lobis ovatis subacutis circiter 1 mm. longis. *Corolla* statu florifero non visa, sed in statu fructifero valde accrescens, calyptriformis, apice in caudam 6 cm. longam producta, extra retrorse vel patenter strigoso-setosa. *Fructus* breviter stipitatus, obovatus, apice in caudam 1–1·5 cm. longam productus, in toto 3 cm. longus, 1·5 cm. latus, lateraliter compressus, in sectione ellipticus, strigoso-setosus, profunde rugosus, costis marginalibus validis.

Southern Nigeria: Mamfe, a forest climber, Jan. 1932 *Maitland* 1167.

This species is readily distinguished from its congeners by the very long tail of the fruiting corolla. From its nearest ally, *C. Thomsoniana* Baill., it is distinguished by its glabrous, abruptly acuminate leaves, which are inclined to be broadest towards the apex, cuneately narrowed to the obtuse base, and somewhat larger than in that species. The fruiting corolla is also less densely hairy, and lacks the expanded rim immediately above the adnate portion of the fruit which appears to characterise *C. Thomsoniana*.

Loranthus ngurukizi *E. A. Bruce*, sp. nov. [Loranthaceae]: affinis *L. Acaciae* Zucc. (§ *Tapinostemma*) sed floribus majoribus nec versus basin gibbosis, calyce truncato differt.

Caules juniores rubro-fusci, crassi, glabri, lenticellis elongatis cinereis prominentibus adspersis, maturi lignosi, cortice glabro griseo rugoso conspicue lenticellato. *Folia* opposita vel subopposita, breviter petiolata, petiolo glauco 2 mm. longo, oblongo-lanceolata usque obovata, apice obtusa vel rotundata, basi cuneata, 2–4 cm. longa, 1–2·3 cm. lata, coriacea, glauca, glabra, e basi 3-nervata, nervis sub-parallelibus. *Inflorescentia* umbellata, axillaris, pauciflora, pedicellis 5 mm. longis; bracteae parvae, disciformes, unilateraliter ampliatae. *Calyx* (receptaculo incluso) cupuliformis vel suburceolatus, 4–5 mm. longus, glaber, limbo truncato vel undulato. *Corolla* gamopetala, profunde coccinea, circiter 5·5 cm. longa, tubo 2·0–3·0 cm. longo nec gibboso; lobi 5, utrinsecus basin versus cristis 5 descendentibus ad basin filamentorum adnatis, cristis lanceolatis circiter 1·5 mm. longis; loborum apices liberi circiter 2 cm. longi, lineares, subacuti. *Filamenta* circiter 4 cm. longa, partibus tribus inferioribus adnatis. *Antherae* circiter 1 cm. longae, lineares. *Stylus* circiter 5·5 cm. longus, cylindricus, glaber, stigmate capitato.

Tanganyika Territory. Manyoni Kopje, 4200 ft., parasitic on *Commiphora kyimbilensis* Engl., *B. D. Burtt* 3419 (type).

Vernacular name: *Ngurukizi*.

This is a remarkable plant, the young stem of which resembles the aerial root of an epiphytic orchid ; the flowers are deep pink in colour tipped with greenish-blue. It differs from the other two species in the section by the absence of the gibbous sacs at the base of the corolla-lobes.

Otiophora caerulea (*Hiern*) *Bullock*, comb. nov. [Rubiaceae]. *Pentanisia caerulea* Hiern, Cat. Welw. Afr. Pl. **2**, 471 (1898).

A re-examination of a specimen of the type-number of this plant shows that the ovules are erect, not pendulous as in the genus *Pentanisia* Harv. This, coupled with the presence of a very narrow, almost filiform corolla-tube, exserted stamens with slender, comparatively long filaments, and the tendency to enlargement of one or more of the calyx-teeth, is ample justification for transferring it to *Otiophora* Zucc. The following specimens are incorporated in the Kew herbarium :—

Tanganyika Territory : Iringa Province ; Lower Plateau north of Lake Nyassa, *Thomson* ! Kyimbila district ; Bundali, 18 May, 1912, *Stolz* 1280 ! Bulambya, 15 March 1913, *Stolz* 1947 ! Mbosi, about 5400 ft., Nov. 1928, *Haarer* 1592 ! Njombe, 6000 ft., Oct. 1931, *Staples* 211 ! Njombe, 10 Dec. 1931, *Lynes* D.p. 114 !

Nyasaland : Nyika Plateau, 6000–7000 ft., July 1896, *Whyte* 193 ! Between Mpata and the commencement of the Tanganyika Plateau, 2000–3000 ft., July 1896, *Whyte* ! Masuku Plateau, 6500–7000 ft., July 1896, *Whyte* !

Northern Rhodesia : Mwinilunga, 4500–5000 ft., Jan.-March, 1929, *Marks* 77 !

Angola : R. Monino, along the road to Quilengues, Huilla, Feb. 1860, *Welwitsch* 5314 ! (type in Brit. Mus. Herb., dupl. in Kew Herb.). Benguella ; between R. Cutato and R. Cuchi, as far as Munongue, *Gossweiler* 2437 ! between rivulets Cuanza and Cului, Dec., *Gossweiler* 2932 !

Pygmaeothamnus concrescens *Bullock*, sp. nov. [Rubiaceae] ; a *P. Zeyheri* (Sond.) Robyns foliis oppositis, floribus multo majoribus facile distinguitur.

Suffrutex nanus, erectus, circiter 15–25 cm. altus ; caules annui, simplices, lignosi, glabri, e rhizomate subterraneo orti, internodiis usque ad 7 cm. attingentibus sed plerumque circiter 2–5 cm. longis. *Stipulae* intrapetiolares intus villosae, ceterum glabrae, basibus latis truncatis vaginato-connatis, longe caudato-subulatae caudis acutis erectis usque 6·5 mm. attingentibus. *Folia* opposita, glaberrima, leviter discoloria (subtus glauca ?), elliptica vel anguste obovata, apice breviter et abrupte acuminata, vel fere rotundata et breviter apiculata, basi in petiolum circiter 1 cm. longum sensim angustata, lamina circiter 8–10 cm. longa et 3–5 cm. lata, inferne valde redacta, costa et nervis lateralibus (utrinque circiter 5) satis prominentibus, venis reticulatis. *Flores* albi, in cymas dichasiales axillares pedunculatas circiter 10–15-floras dispositi ; pedunculus sub anthesin

2 cm. longus, satis crassus, statu fructifero usque 5 cm. longus et basin versus caulis coalitus; pedicelli crassi, 3–6 mm. longi; bracteae et bracteolae lineares, minutae. *Calyx* glaber, campanulatus, tubo (ovario incluso) 4·5 mm. longo, apice 3 mm. diametro, lobis 5 anguste triangularibus 4 mm. longis basi 2 mm. latis apice acutis. *Corollae lobi* 5, sub anthesin reflexi, oblongi, subacuti, 5 mm. longi, 2 mm. lati, glabri; tubus subconico-cylindricus, 5 mm. longus, usque 3·5 mm. diametro, intus infra faucem pilis villosis reflexis annulatus. *Filamenta* brevissima. *Antherae* alabastro circa stigma cohaerentes, sub anthesin liberae, lanceolatae, apice acutae, basi sagittatae, 3 mm. longae et 1·5 mm. latae, margine hyalinae. *Ovarium* 2-loculare; ovula in loculis solitaria, pendula; stylus 7 mm. longus, apicem versus leviter angustatus; stigma capitatum, 2 mm. longum et medio 2 mm. diametro, apice bifidum. *Fructus* drupacei, carnosi, plerumque abortu uniloculares, subglobosi, circiter 2 cm. diametro.

TANGANYIKA TERRITORY: Iringa Province; Njombe, a very common small shrub, with white flowers, 10 Dec. 1931 (fl.), *Lynes* D.p. 108 (type); 6000 ft., a woody herb 1 ft. high, with leathery leaves, common in patches in grassland, Aug. 1931 (fr.) *Mr. and Mrs. H. E. Hornby* 65.

This peculiar genus of undershrubs, established by Dr. Robyns* to include four species (with several varieties), is very closely allied to *Canthium* Lam. (*Plectronia* Auctt., non Linn.).

A figure of this species, and a general discussion of the genus as a whole, is being prepared for early publication in Hooker's *Icones Plantarum*.

Tapiphyllum floribundum *Bullock*, sp. nov. [Rubiaceae]; *T. obtusifolio* (K. Schum.) Robyns affine, ramis stricte angulo recto patentibus persistenter molliter tomentellis, internodiis longioribus, pedunculo brevissimo sed distincto, floribus numerosioribus majoribus differt; a *T. velutino* Robyns foliis haud basi cordatis, floribus multo numerosioribus haud fasciculatis facile distinguitur.

Frutex erectus, usque 4 m. altus, ramosissimus, omnino molliter tomentoso-pubescens; rami angulo recto patentes, satis crassi, laeves, indumento molliter albido-tomentello persistente vestiti, cortice maturo haud rugoso sed demum brunneo-rubro et longitudinaliter fisso; ramuli hornotini dense flavo-tomentosi, internodiis 1–3 circiter 3·5–6 cm. longis praediti. *Stipulae juniores* in vaginam 3 mm. longam connatae, intus dense molliterque albido-villosae, extra flavo-tomentosae, in appendicem lineari-filiformem usque 7·5 mm. longem desinentes. *Folia* opposita, elliptica usque obovata, apice rotundata usque subacuta, basi rotundata vel subtruncata, haud cordata, usque 4 cm. longa et 3 cm. lata (juniora), ad margines undulata, utrinque dense flavo-piloso-tomentosa, subtus pallidiora, nervis lateralibus utrinsecus circiter 8 satis prominentibus; petioli tomentosi, circiter 4–7 mm. longi. *Flores* ad nodos ramulorum

*Robyns, "Tent. Monogr. Vangueriae" in Bull. Jard. Bot. Brux. **11**, 29 (1928).

annotinorum in cymas tomentosas axillares oppositas globosas circiter 15–20-floras congesti ; pedunculi circiter 5 mm. longi, apice bracteis duabus oppositis ovatis 9 mm. longis et 5 mm. latis apice acutis praediti ; pedicelli obsoleti vel usque 2 mm. longi ; bracteolae bracteis similes sed minores. *Calyx* (ovario incluso) 9 mm. longus, fere ad discum 5-lobatus, lobis erectis linearibus vel lineari-lanceolatis 6 mm. longis et 1 mm. latis, pilis satis longis dense tomentoso-indutus. *Corolla* alabastro apice apiculata, acuta, 8 mm. longa, extra pilosa, sub anthesin tubo cylindrico 4 mm. longo intus pilis villosis annulato, lobis patentibus oblongo-ovatis 3 mm. longis (appendicibus exclusis) et 1·75 mm. latis intus glabris, appendicibus loborum lineari-subulatis longe pilosis 2 mm. longis. *Antherae* inter lobos exsertae, oblongae, 1·25 mm. longae, basi cordatae, filamentis brevissimis fauce insertis. *Stylus* 5 mm. longus, satis crassus, apicem versus gracilescens, stigmate coroniformi-cylindrico fere 1 mm. longo 5-sulcato apice 5-lobulato. *Discus* annularis, carnosus, 1·5 mm. diametro. *Ovarium* hemisphaericum, 2·5 mm. diametro, 5-loculare. *Fructus* non visi.

Tanganyika Territory : Manyoni Kopje, 4200 ft., a shrub to 12 ft. high in deciduous thicket and dry *Brachystegia-Berlinia* woodland, 28 Dec. 1931, *B. D. Burtt* 3458 (type) ; without exact locality, Iringa District, 15 Dec. 1927, *B. D. Burtt* 709 ; Kondoa District ; Swagaswaga, about 4500 ft., a pubescent shrub of the *Berlinia* savannah on reddish sandy soils, 21 Dec. 1927, *B. D. Burtt* 875. Kiringi name :—*Mdedu*.

The characteristic, long persistent indumentum of the otherwise smooth branchlets of this species at once distinguishes it from its nearest ally, *T. obtusifolium* (K. Schum.) Robyns. The internodes of the latter are, however, very short compared with those of the present plant, and they rapidly become almost glabrous. Among more minute characters the very long appendix of the corolla-lobes of *T. floribundum* may be mentioned. These are not equalled in any of the shrubby species of the genus, and scarcely exceeded among the herbaceous species. The very long calyx-lobes are also unique among the shrubby species.

Lobelia Burttii *E. A. Bruce*, sp. nov.* [Lobeliaceae] ; affinis *L. Bequaertii* De Wild. sed lobis corollae erectis nec reflexis apice glabris, bracteis angustioribus differt.

Planta 0·5–2·0 m. alta ; rosula foliorum stipitata. *Folia* 14–25 cm. longa, 3–5 cm. lata, sessilia, lineari-lanceolata vel ovato-lanceoalta, infra medium latissima, apicem versus sensim angustata, apice rotundata vel acuta, breviter apiculata, utrinque glabra, margine integro ciliato ; nervi laterales sub angulo 45° abeuntes, infra inconspicui, supra manifesti. *Bracteae* floribus duplo longiores, 6–9 cm. longae, 2·5–3·5 cm. latae, ovatae, infra medium latissimae, acutae vel sensim acuminatae, margine

*A figure of this species will appear in a forthcoming number of the Kew Bulletin.

integro parce ciliato, utrinque glabrae. *Pedicelli* glabri, circiter 1 cm. longi vel minus, basin versus bracteolis 2 squamiformibus circiter 1·5 mm. longis instructi. *Calycis tubus* campanulatus, glaber, alabastro 0·1–0·8 cm. longus, 0·4–0·6 cm. latus ; lobi triangulares vel anguste lanceolati, 0·7–1·2 cm. longi, basi 0·2–0·4 cm. lati, apice rotundati vel subacuti, minute apiculati, utrinque glabri, marginibus parce ciliati, fructu lobis usque 1·5 cm. longis 0·5 cm. latis, tubo usque 1·5 cm. longo 1 cm. lato. *Corolla* circiter 3 cm. longa, violacea vel profunde caeruleo-lilacina, extra glabra, dorso fissa, lobis erectis, 2 lateralibus infra medium liberis, 3 media in parte superiore liberis, late linearibus acuminatis extus glabris intra in tertia media crispe pubescentibus aliter glabris. *Filamenta* circiter 2 cm. longa, glabra, infra medium libera ; antherae circiter 0·9 cm. longae.

Tanganyika Territory: Mbulu District ; Mt. Hanang, 11,000 ft., in the mossy shade of the lava cliffs on the west face of the crater just below the summit of the mountain, *B. D. Burtt* 4049 (type). Arusha District ; Mt. Meru, south side of cone, 12,000–13,000 ft., among *Helichrysum Newii, Erica, Philippia* and *Alchemilla*, especially in ravines, *B. D. Burtt* 4128. Mbulu District ; Ngoro-ngoro, Mt. Loolmalassin, 11,000 ft., in a small marsh on south side of the mountain, among *Erica, Philippia* etc., *B. D. Burtt* 4214.

Craterostigma lindernioides *E. A. Bruce*, sp. nov. [Scrophulariaceae] ; omnibus congeneribus gracilior, inflorescentia laxiore pedicellis longioribus differt.

Herba annua, erecta, glabra, haud ramosa, circiter 12 cm. alta ; caules sulcati, complanati, leviter torti, internodiis 1–2 cm. longis. *Folia* opposita, sessilia, linearia, circiter 1 cm. longa, apice acuta. *Flores* pauci, axillares, rubri, flavido- atque caeruleo-notati, pedicellis gracilibus circiter 1 cm. longis. *Calyx* 5-dentatus, plicatus, lobis lanceolatis ciliatis circiter 1 mm. longis, tubo anguste campanulato circiter 2·5 mm. longo. *Corollae* tubus brevis, labio superiore erecto oblongo-ovato 3 mm. longo apice late rotundato, labio inferiore 3-lobato plus minusve patente lobis apice rotundatis. *Stamina* 4, inferioribus 2 corollae fauce insertis, filamentis circiter 2 mm. longis basi gibbosis, superioribus 2 in tubo insertis, antheris monothecis cohaerentibus. *Ovarium* anguste elongato-ovoideum, glabrum, stylo lineari simplici circiter 4 mm. longo, stigmate complanato elliptico. *Capsula* anguste ovoideum, apice acuta, leviter arcuata.

Tanganyika Territory : Manyoni District ; Kazikazi, 4100 ft., along the wet margin of a seasonal pond, among *Eriocaulon elegantulum*, *B. D. Burtt* 3612 (type).

In its habit this plant resembles *Lindernia*, but the gibbous swellings at the base of the filaments place it in the genus *Craterostigma*.

Rhamphicarpa filicalyx *E. A. Bruce*, sp. nov. [Scrophulariaceae] ; ab omnibus speciebus tropicis africanis calycis lobis longe filiformibus valde distincta.

Herba erecta, 25–40 cm. alta : caulis simplex vel 10–15 cm. supra basin leviter ramosus, plus minusve glabrescens. *Folia* linearia usque lineari-filiformia, sessilia, apice acuta vel subacuta, 2–6 cm. longa, 0·1–0·2 cm. lata, integra vel raro basin versus lineari-lobulata, infra glabra, supra scabrida. *Flores* solitarii, supra axillas foliorum orti. *Calycis tubus* cupuliformis, 10-striatus, circiter 3 mm. longus, pilis paucis strigosis instructus : lobi 5, longe filiformes, 1·5–3·0 cm. longi, apice acuti, scabridi. *Corolla* alba, demum caerulea ; tubus anguste cylindricus, 1·5–2·5 cm. longus, extra glanduloso-pubescens, intus striguloso-pubescens, lobis 4 obovatis apice rotundatis suberectis vel leviter patentibus glabris circiter 1 cm. longis 0·5 cm. latis. *Stamina* 4, infra medium corollae tubi inserta, filamentis circiter 2 mm. longis, dense pubescentibus, antheris aequilongis monothecis lanceolatis apice acutis. *Ovarium* ovoideum, valde obliquum, glabrum, apice in rostrum longum productum, stylis circiter 7 mm. longis apicem versus hirsutis alioqui glabris. *Fructus* oblique ovoideus, rostratus, circiter 7 mm. longus, 9 mm. latus, glaber. *Semina* numerosa, glabra, ovoidea usque cylindrica, rugosa.

Tanganyika Territory : Iringa District; in cattle pastures in the plain of the Little Ruaha River, *Lynes* P.g. 70 (type). Tabora District ; Tabora, fairly common, *Durham* s.n.

Utricularia appendiculata *E. A. Bruce*, sp. nov. [Lentibulariaceae] ; affinis *U. striatulatae* Smith, sed statura majore scapo implicato, bracteis medifixis differt.

Herba terrestris, gracilis, glabra, scapis implicatis usque ad 30 cm. longis, stolonibus paucis e basi scapo ortis. *Folia* non visa. *Flores* 2–5, remoti, pedicellis circiter 2 mm. longis. *Bracteae* medifixae, circiter 2·5 mm. longae, lanceolatae, acutae. *Calycis* lobi inaequales, inferior ovato-lanceolatus obtusus, superior ovato-orbicularis, ambo circiter 3 mm. longi. *Corolla* pallido-flava, palato pallido-purpureo striato nec papilloso, labio superiore ovato-lanceolato acuto erecto, lobis calycis subaequali, labio inferiore ovato integro circiter 3 mm. longo calcari subparallelo. *Capsula* globosa.

Tanganyika Territory : Bukoba District ; Biharamulo road, 4000 ft., among *Sphagnum*, *Drosera* and *Eriocaulon*, *Haarer* 2056 (type) : Lake Nabugabo, 3750 ft., in *Sphagnum* bog, *Eggeling* 960.

This species belongs to the group which has the bracts attached near the middle ; it is also characterized by its twining stem.

Saintpaulia alba *E. A. Bruce*, sp. nov. [Gesneriaceae] ; affinis *S. Goetzeanae* Engl. sed foliis majoribus crenatis pedunculo multifloro differt.

Caulis simplex, 3–6 cm. longus, leviter pubescens, demum glaber. *Folia* fusco-viridia, alterna, petiolata, petiolo 0·5–2·0 cm. longo

leviter pubescente et parce strigoso ; lamina ovata usque oblonga, 5–10 cm. longa, 3·0–3·5 cm. lata, apice rotundata, basi rotundata vel cuneata supra pilis brevibus appressis obtecta, infra glabra praeter nervos paucos appresse pubescentes, margine crenato ; nervi laterales sub angulo fere 90° patentes, arcuati, utrinsecus circiter 12. *Cymae* multiflorae ; pedunculi axillares, 4–8 cm. longi, pilis ascendentibus ; pedicelli graciles, 0·5–1·0 cm. longi, pubescentes. *Calyx* fere ad basin 5-lobatus, lobis oblongis circiter 2 mm. longis extra pilis ascendentibus intus glabris. *Corollae* tubus albus, late campanulatus, circiter 5 mm. longus, 4 mm. latus, leviter longe pubescens, lobis ovatis apice rotundatis 2 superioribus circiter 2 mm. longis 2 inferioribus circiter 4 mm. longis. *Stamina* 2 basi corollae tubi inserta, filamentis glabris circiter 2 mm. longis, antheris magnis orbicularibus circiter 2 mm. longis cohaerentibus. *Ovarium* oblongo-ovoideum, circiter 2 mm. longum, dense pubescens, stylis glabris circiter 4 mm. longis.

Tanganyika Territory : Morogoro District ; Uluguru Mountains, Lupanga Mt., 6500–7000 ft., a spectacular white-flowered herb in the semi-shade of a tree-fern forest on a steep moss covered rock slope, *B. D. Burtt* 3470 (type) !

Streptocarpus hirsutissimus *E. A. Bruce*, sp. nov. [Gesneriaceae] ; affinis *S. hirtinervi* C. B. Cl. sed foliis integris, floribus majoribus differt.

Herba erecta, usque 50 cm. alta ; caulis simplex, circiter 1 cm. crassus, 20–30 cm. longus, pallide fuscus, pilis multicellulatis lucidis dense instructis. *Folia* caulis apicem versus 8–12-rosulata breviter petiolata, petiolo usque 1 cm. longo, pilis multicellulatis dense instructo ; lamina integra vel leviter undulata, oblanceolato-obovata, basi cuneata, apice subacuta, matura circiter 6 cm. longa, 2·5 cm. lata, juniora 1–3 cm. longa, supra dense hirsuta, subtus nervis valde prominentibus dense hirsutis pilis lucidis multilocellatis ; nervi laterales utrinsecus 12–14, ascendentes. *Pedunculus* 6–12 cm. longus, hirsutus, circiter 5-florus, pedicellis usque 1 cm. longis, fructu elongatis. *Calyx* ad basin lobatus, lobis linearilanceolatis 5–7 mm. longis extra praesertim apicem versus dense hirsutis, intus glabris. *Corolla* pallide violacea, 5–6 cm. longa, tubo cylindrico apicem versus leviter expanso pubescente circiter 6 cm. diametro, lobis rotundatis vel obovatis 1–1·5 cm. longis. *Stamina* medium versus tubi inserta, filamentis circiter 8 mm. longis apicem versus alatis breviter pubescentibus ; antherae rotundatae, basi anguste cordatae, 3 mm. latae. *Ovarium* dense pubescens, stylo pubescente. *Capsula* circiter 8 cm. longa, 3 mm. lata.

Tanganyika Territory : Morogoro District, Uluguru Mountains, Lupanga Peak, 6000 ft., approximately, in the crevices of a vertical cliff face growing in wet moss and leaf litter in an exposed position, *B. D. Burtt* 3462 (type).

Disperma trachyphyllum *Bullock*, sp. nov. [Acanthaceae] ; a *D. parvifloro* C. B. Cl. foliis minoribus scabrido-pubescentibus vix

acuminatis basi rotundatis, ramis subglabris vel puberulis haud setosis differt.

Suffrutex erectus, usque 1·5 m. altus, ramis quadrangularibus glabrescentibus vel leviter puberulis. *Folia* elliptica usque ovata, circiter 3·5–5·5 cm. longa et 2–3 cm. lata, apice obtusa vel subacuta, basi rotundata, supra scabrido-pubescentia, infra praesertim costa et nervis lateralibus prominentibus (utrinsecus 4–6) patenter pubescentia, crenato-dentata, petiolis pubescentibus usque 5 mm. longis. *Flores* in axillis glomerati, cymosi, bracteis et bracteolis oppositis basi connatis dense breviter pubescentibus ; bracteae oblongae vel lanceolato-ovatae, infimae circiter 1 cm. longae et 4·5 mm. latae ; bracteolae minores, lanceolatae. *Calyx* sub anthesin in toto 8 mm. longus, segmentis 2 anticis connatis parte apicali libera 2 mm. longa, segmentis 3 posticis fere usque ad basin liberis, omnibus longe ciliatis. *Corolla* alba, 1·3 cm. longa, tubo cylindrico 8 mm. longo. *Antherae* exsertae, 1·5 mm. longae. *Ovarium* oblongum, 2 mm. longum, 2-ovulatum ; stylus 8 mm. longus, leviter patenter pubescens, inaequaliter 2-fidus. *Capsulae* maturae non visae, sed juniores in calyce et bracteolis accrescentibus inclusae.

Tanganyika Territory: Dodoma Province; Mpwapwa, 4000 ft., a common white-flowered subshrubby herb up to 4 ft. high, growing in a dark brown soil in the *Brachystegia-Combretum* association on stony hill slopes, 18 Aug. 1930, *Greenway* 2391.

Known locally as "Asbestos-bush," *Disperma trachyphyllum* forms impenetrable thickets.

Disperma crenatum (*Lindau*) *Milne-Redhead*, comb. nov. [Acanthaceae] ; *Hygrophila crenata* Lindau in Engl. Bot. Jahrb. **20,** 6 (1894) ; *Disperma quadrisepalum* C. B. Cl. in Dyer, Fl. Trop. Afr. **5,** 80 (1899).

Coleus Daviesii *E. A. Bruce*, sp. nov. [Labiatae] ; affinis *C. cunenensi* Baker sed foliis glabris, caulibus haud strigosulis pubescentibus, paniculis densioribus differt.

Herba perennis, erecta, lignosa, 1–1·3 m. alta, ramis 4-angulatis, junioribus breviter et dense glanduloso-pubescentibus, demum glabrescentibus. *Folia* petiolata, ovata vel ovato-lanceolata, apice obtusata, basi decurrentia, 2·5–4 cm. longa, 1·0–2·3 cm. lata, margine crenata, utrinque dense glandulosa, nervis infra valde prominentibus supra impressis ; petioli 0·2–1·5 cm. longi, supra sulcati. *Inflorescentia* terminalis, glandulosa et pubescens, dense paniculata, circiter 11 cm. longa, 4 cm. lata ; cymae laterales pedunculatae, ramosae, 6–10-florae, pedicellis sub anthesin usque ad 3 mm. fructu 5 mm. longis. *Calyx* bilabiatus, pubescens, 3 mm. longus, 4-lobus, lobis inferioribus aequalibus anguste oblongo-lanceolatis apice obtusis vel subacutis, lobo superiore obovato vel late oblongo apice rotundato. *Corolla* leviter puberula, circiter 9 mm. longa, labello superiore brevissimo inferiore longo concavo. *Stamina* declinata, inclusa vel leviter exserta, filamentis dimidio connatis. *Calyx* fructu circiter 6 mm. longus, glanduloso-pubescens.

Tanganyika Territory: Rungwe District; Mt. Rungwe; a herb with white flowers 3–4 ft. high, occurring in the Camburu belt, *R. M. Davies* R.4 (type).

Aloë (Eualoë) ortholopha *Christian et Milne-Redhead*, sp. nov. [Liliaceae]; ab *Aloë Marlothii* Berger habitu acauli, foliis supra et subtus laevibus inermibus facile distinguitur.

Planta acaulis. *Folia* circiter 30 vel pluria, dense rosulata, erecta, lanceolata vel ovato-lanceolata, usque 55 cm. longa, medium versus 14 cm. lata et 14 mm. crassa, apice acuta, margine dentibus deltoideis 4 mm. longis corneis rubro-brunneis inferne 7 mm. superne 15 mm. distantibus armata, interstitiis rectis, supra prope basin plana, apicem versus striata, subtus gibba, glauca, griseo-viridia. *Inflorescentia* circiter 1 m. alta, ramosa, ramis 3–7 vel interdum 10 horizontalibus circiter 50 cm. longis robustis; bracteae ramos subtendentes ovato-deltoideae, 15 mm. latae, 13 mm. longae, membranaceae; bracteae vacuae infra racemum paucae, ovatae, acutae, 5-nerves, scariosae; racemi densissimi, usque 45 cm. longi, floribus conspicue secundis erectis; bracteae florum ovatae, acutae, 7 mm. latae, 12 mm. longae, 5-nerves, scariosae; pedicelli circiter 5 mm. longi, robusti, valde lateraliter compressi. *Perianthia* usque 42 mm. longa, basi 7 mm. diametro, medium versus ampliata usque 10 mm. diametro, apicem versus leviter angustata et apice leviter curvata, recta, trigona, tubo circiter 13 mm. longo, pallide aurantiaco-rubra usque saturate sanguinea; segmenta exteriora inconspicue nervosa, circiter 8 mm. lata; segmenta interiora 10 mm. lata, alba, apicem versus aurantiaco-rubra, linea mediana rubra percursa. *Stamina* robusta, valde compressa, sub anthesin 10 mm. exserta, parte inclusa pallide lutea, parte exserta brunneo-purpurea, demum in perianthium retracta; antherae 6 mm. longae, rubro-luteae. *Stylus* exsertus, pallide luteus; ovarium 9 mm. longum, 4 mm. diametro.

Southern Rhodesia: M'toroshouga Pass in the Umvukwes Hills on the Great Dyke, 5000 ft., cultivated at Salisbury, 19 Aug. 1926, *Herb. Dep. Agr. S. Rhod.* 1201 (*Eyles* 5448 in Herb. Eyles: type).

I am indebted to Mr. H. Basil Christian, for forwarding to Kew, through Mr. Eyles, a detailed English description of this *Aloë* drawn up from living specimens in his collection at Ewanrigg, and also photographs showing the habit of the plant. In his notes he says: "This *Aloë* (No. 289) has only been recorded from the M'toroshouga Pass, at an altitude of 5000 ft., on rocky treeless hills, the formation being serpentine rock. It only occurs on the hills on the south side of the pass for a distance down the pass of about 3 miles and to a depth of about half a mile. No other species of *Aloë* is found growing in the vicinity, but no. 289 is found growing in thousands. It flowers in July and August, the colour of the flowers varying in different plants from a light orange-red to a deep blood-crimson.

PLATE XVIII

Aloë ortholopha growing in Mr. Basil Christian's garden at Ewanrigg, Arcturus, Southern Rhodesia.

[*To face page* 478.

The flowers are secund from the bud stage, and not, as in *A. Marlothii*, at length becoming secund."

The specific epithet refers to the crest-like appearance of the horizontal racemes of upright flowers. The photograph here reproduced is of a specimen cultivated in the garden of Mr. Basil Christian at Ewanrigg, Arcturus.—E. M.-R.

LX—RESEARCHES ON SILENE MARITIMA AND S. VULGARIS : XII.*—E. M. Marsden-Jones and W. B. Turrill.

A Statistical Study of Characters in two Wild Populations of S. maritima.

The following are the field observations on the two populations of which samples are analyzed below :

I. Chesil Beach, Abbotsbury end, Dorset, July 12 to 14, 1932. We have already considered the characters of certain plants from this locality and refer to our paper in Kew Bull. 1929, 170–173 for details.

II. Land's End District, between Nanjizal and Porthgwarra, W. Cornwall, July 15 to 20, 1932.

The habitat characters for the two populations compare and contrast as follows :—

I.	II.
Sea-coast.	Sea-coast.
Shingle, unstabilized.	Sea-cliffs.
Flint pebbles.	Granite.
Soil absent.	Soil shallow, except in crevices.
Other vegetation little or none.	Other vegetation of *Armeria*, *Limonium*, grasses, etc.
Competition with other species, none, ample room to spread laterally except when in competition with other individuals of the same species.	Competition with other species, often acute in closed communities, giving little room for lateral spread.
Habit prostrate and widely sprawling.	Habit low-growing and compacted.

Length of flowering stems. The longest stem per plant, including inflorescence, measured to nearest cm.

I. Maximum 4·7 dm. Minimum 2·3 dm. Mean 3·6 dm. Standard deviation 0·48.

II. Maximum 3·1 dm. Minimum 0·9 dm. Mean 1·95 dm. Standard deviation 0·46.

Length of longest internode. The longest internode, with an exception of 1 per cent. always that immediately below the inflorescence, was measured to the nearest mm.

* Continued from *K.B.* 1933, 362.

I. Maximum 142 mm. Minimum 30 mm. Mean 65·9 mm. Standard deviation 18·7.
II. Maximum 80 mm. Minimum 9 mm. Mean 43 mm. Standard deviation 16·0.

Anthocyanin in Vegetative parts. This has been scored into three classes—much, some, none. In the samples all plants had either much or some anthocyanin in the vegetative parts, although plants quite devoid of anthocyanin have been found both on the Chesil Beach and also in the Cornish population of which a sample is analyzed here.

The values obtained were :—

I. Much anthocyanin 97% : Some anthocyanin 3%.
II. Much anthocyanin 9% : Some anthocyanin 91%.

Indumentum. All the plants in the samples of both populations were glabrous. The term " glabrous," as we apply it to the vegetative parts in *Silene*, indicates that no hairs are developed on the stems or on the leaf-surfaces. The fluctuating character of leaf-ciliolations is considered apart from general indumentum or its absence.

Length and breadth of leaves. Measurements were made of normally developed leaves to the nearest mm.

	I.	II.
Maximum length	24	20
Minimum length	5	7
Mean length	16	12·5
Standard deviation	3·6	3·05
Maximum breadth	6	6
Minimum breadth	2	1
Mean breadth	3·34	2·63
Standard deviation	1·0	1·01
Correlation of length to breadth	0·48	0·67

The correlations of leaf (and petal) length to breadth have been worked out on the formula :—

$$r = \frac{S\,(x-\bar{x})\,(y-\bar{y})}{\sqrt{S\,(x-\bar{x})^2\;\;S\,(y-\bar{y})^2}}$$

Number of flowers. In each plant the flowers were counted in the inflorescence with the largest number.

I. Maximum 7. Minimum 1. Mean 3·11. Standard deviation 0·85.
II. Maximum 6. Minimum 1. Mean 1·72. Standard deviation 0·96.

Calyx Shape. This has been scored into three classes—inflated, subinflated, narrow (see Kew Bull. 1931, 128 and figs. 24–26).

The values obtained were :—

I. Inflated 43 : Subinflated 53 : Narrow 4.
II. Inflated 17 : Subinflated 60 : Narrow 23.

Anthocyanin in calyx. This has been scored into three classes—much, some, none. In the samples all plants had at least some anthocyanin in the calyx, although plants quite devoid of anthocyanin have been found both on the Chesil Beach and also in the Cornish population of which a sample is analyzed here. Such plants are very rare, more so in western Cornwall than on the Chesil Beach.

The values obtained were :—

I. Much anthocyanin 89%. Some anthocyanin 11%.
II. Much anthocyanin 10%. Some anthocyanin 90%.

Corolla. *Petal length and breadth.* Measurements were made to the nearest mm.

	I.	II.
Maximum length	23	22
Minimum length	14	12
Mean length	18·87	17·83
Standard deviation	1·76	1·49
Maximum breadth	13	12
Minimum breadth	4	5
Mean breadth	8·34	8·08
Standard deviation	1·56	1·41
Correlation of length to breadth	0·54	0·54

Lobing of petals. Lobing has been scored into bilobed and multilobed. All plants with some petals clearly multilobed on some flowers have been scored into the second class. The results obtained were :—

I. Multilobed 14 : Bilobed 86.
II. Multilobed 9 : Bilobed 91.

Depth of Petal Lobing. This has been scored into two classes—$\frac{3}{4}$ lobing and $\frac{2}{3}$ lobing—with the following results :—

I. $\frac{3}{4}$ lobed 100 : $\frac{2}{3}$ lobed 0.
II. $\frac{3}{4}$ lobed 93 : $\frac{2}{3}$ lobed 7.

Overlapping of Petals. The plants were scored into two classes, those in which the petals overlapped or were contiguous and those in which the petals did not overlap and were not contiguous. The results obtained were :—

I. Overlapped 85 : Not overlapped 15.
II. Overlapped 80 : Not overlapped 20.

Overlapping of Petal Lobes. The plants were scored into two classes, those in which the petal lobes overlapped or were definitely contiguous and those in which the petal lobes did not overlap and were not contiguous. The results obtained were :—

I. Overlapped 71 : Not overlapped 29.
II. Overlapped 54 : Not overlapped 46.

All four possible combinations of overlapping or not overlapping of petals and lobes occurred in each of the two samples. In both populations, as judged from the samples, overlapping of petals was more frequent than overlapping of lobes, more so in the Cornish than in the Chesil Beach population. In both samples petals and lobes overlapping (including contiguity) occurred more often than not overlapping (divergence).

Anthocyanin Blotch on Petals.

I. Present 60 : Absent 40.
II. Present 21 : Absent 79.

We know, from earlier observations, that a higher proportion of plants in the Chesil Beach population than in at least many other populations shows anthocyanin blotch on the petals.

Corona. Silene maritima usually has a well marked bifid scale on each petal, but plants with small scales sometimes occur and, very rarely, only a boss is distinguishable. The two samples here considered gave the following results on scoring into three classes :—

I. Scale (well-marked) 95 : Small scale 5 : Boss 0,
II. Scale (well-marked) 88 : Small scale 11 : Boss 1.

Sex. The plants were scored into hermaphrodite when all the flowers scorable on the date given for each sample contained functional androecium and gynoecium, female when functional stamens were absent in all scorable flowers, hermaphrodite and female (gynomonoecious) when some flowers were functionally hermaphrodite and others had no functional stamens. Stamen vestiges are always present. The results obtained were :—

I. Hermaphrodite 91 : Female 2 : Hermaphrodite and female 7.
II. Hermaphrodite 93 : Female 3 : Hermaphrodite and female 4.

Androecium. *Filament Colour.* The plants were scored for presence or absence of colour in the filaments, anthers, stigmata, and immature seeds, not for depth of colour.

The results obtained for filament colour were :—

I. Purplish 33 : White 65.
II. Purplish 23 : White 74.

This character and the next is, of course, not scorable in plants with only female flowers.

Anther Colour.

I. Purplish 98 : Yellowish-green 0.
II. Purplish 97 : Yellowish-green 0.

Gynaeceum. *Stigma Colour.*

I. Purplish 48 : White 52.

II. Purplish 33 : White 67.

Immature Seed colour (*testa*).

I. Purplish 100 : White 0.

II. Purplish 98 : White 0.

The character was unscorable in two plants in II.

Fruit Shape. This was scored only for a sample of 100 items collected from population I on 14 July 1932 and the sample was independent of the sample from which the vegetative and floral characters were scored.

The following results were obtained :—

Capsules of shape	I.	27
,, ,,	II.	32
,, ,,	I-II.	41

Mature Seeds. The sample used for fruit shape in I was used also for scoring the testa characters of the mature seeds, with the following results :—

I. Armadillo 91 : Weak Armadillo 9.

For II, testa characters were scored, in the field, on the plants from which other characters were scored, so far as seeds were present, with the following results :—

II. Armadillo 51 or 54·8% : Weak Armadillo 5 or 5·4% : Tubercled 37 or 39·8%.

Seven plants were not scorable for testa characters and tubercled and strongly tubercled classes were not differentiated.

Summary and Conclusions.

1. A statistical analysis is given of samples of two populations of *Silene maritima*, growing, I, on the Chesil Beach, near Abbotsbury, Dorset, and II, on cliffs near Land's End, Cornwall. The full significance of this analysis will not be apparent till after the publication of comparable analyses on high mountain populations. A comparable analysis of a population of *S. vulgaris* has been published in Kew Bull. 1932, 271.

2. The characters studied may be classified as follows :—

A. *Involving measurements.*
- Lengths of flowering stems.
- Lengths of longest internodes.
- Lengths and breadths of leaves.
- Lengths and breadths of petals.

B. *Involving counts.*
- Numbers of flowers.

C. *Qualitative scoring.*
- Anthocyanin in vegetative parts.
- Indumentum.
- Calyx shape and anthocyanin.
- Lobing, depth of lobing, overlapping, and anthocyanin of petals.

Corona.
Sex.
Anthocyanin in filaments, anthers, stigmata, and immature seeds.
Fruit shape.
Testa markings.

3. Attention is called to the following :—

i. All the plants scored were without hesitation placed in the species *S. maritima*, i.e., they showed the range of habit and general total of characters associated in this species.

ii. The two populations showed statistical differences as follows :—

	I.	II.
Stem mean length	3·6 dm.	1·95 dm.
Longest internode mean length	65·9 mm.	43 mm.
Leaves mean length	16 ,,	12·5 ,,
Leaves mean breadth	3·34 ,,	2·63 ,,
Flowers mean number	3·11	1·72
Petals mean length	18·87 mm.	17·83 mm.
Petals mean breadth	8·34 ,,	8·08 ,,

The contrast in the figures in this table is partly due to the considerable differences in environment under which the two populations were growing. It will be noted that the means are consistently higher for population I, which was subjected to no competition with vegetation composed of other species. On the other hand, we know that the population on the Chesil Beach as a whole is heterozygous for habit and leaf shape, and though the sample was taken from that end where *S. maritima* is least polymorphic the lower correlation of length to breadth of leaves (0·48) compared with that (0·67) for the Cornish population may be connected with genetic differences. That the populations show exactly the same (0·54) correlation for length to breadth of petals was an unexpected coincidence.

iii. The Dorset population (I) had much more anthocyanin in the vegetative parts and in the calyx than had the Cornish population (II). On the other hand no plants in the random samples were devoid of anthocyanin, though such plants have been found in both areas, but are rarer in the Cornish population.

iv. Anthocyanin blotch on the petals, purplish filaments, and purplish stigmata were all commoner in the Dorset population.

v. All plants scorable for the characters in both populations had purplish anthers and purplish immature seeds.

vi. All plants in both populations were glabrous.

vii. The Cornish population had, on the whole, narrower calyces than the Dorset population.

viii. Plants with multilobed petals occurred in both populations. Petal lobing was entirely $\frac{3}{4}$ on the Chesil Beach and mainly $\frac{3}{4}$ (93%) in western Cornwall.

ix. Overlapping of petals and, less markedly especially in the Cornish population, of segments predominated over not-overlapping.

x. The coronal scales were mostly well developed, though small scales occurred in an average of 8% of plants and a mere boss in one plant in Cornwall.

xi. The majority of the plants had only hermaphrodite flowers, but female and gynomonoecious plants occurred in both populations.

xii. There were considerable differences in testa markings in the two samples. In that from Dorset no tubercled seeds occurred, but nearly 40 per cent. of the Cornish sample had tubercled seeds.

The research on which this paper is based has been aided by a Royal Society Government Grant. The detailed tables of measurements, summarized in the above account, have been filed in the Genetical Herbarium at Kew.

LXI—NEW SPECIES OF NOTOTRICHE AND MALVASTRUM FROM THE ARGENTINE. A. W. Hill.

An interesting collection of Nototriches and Malvastrums was sent to Kew recently for determination by Dr. R. A. Pérez Moreau of the National Museum of Natural History, Buenos Aires. Some of them had been collected by Dr. Castellanos, Chief of the Botanical Section of the Museum, in the Sierra Famatina in the years 1928 and 1930. Three proved to be new species, which are here described, two being Nototriches, *N. caesia* and *N. rosulata*, and the other an interesting new *Malvastrum*; two of the new plants were collected by P. Jörgensen in 1916 and one by Rodriguez in 1912.

Nototriche rosulata *A. W. Hill*, sp. nov.; *N. pulvillae* A. W. Hill affinis, stipulis brevioribus laminis supra paullo stellatis infra glabris praecipue differt.

Fruticulus depressus, caespitosus, pulvinatus; caudex subterraneus, lignosus, ramosus. *Folia* arcte aggregata; petiolus 8 mm. longus; stipulae petiolo ultra medium adnatae et cum eo quasi vaginam membranaceam formantes, parte libera membranacea lineari-subulata 3 mm. longa, uti vagina superficie glabra ad margines stellato-tomentosa; lamina ambitu late triangulari-ovata, ad basin cuneata, palmatifida, 7–8 mm. longa, 6 mm. lata, supra sparse tomentosa, infra glabra, segmento medio elongato 12–13-lobato intermediis 3-lobatis, inferis fere integris. *Flores* petiolo medio insidentes, fere sessiles. *Calyx* supra medium 5-lobus, 7 mm. longus, lobis 3 mm. longis triangulari-acutis extra et ad margines praesertim hirsutis. *Corolla* violacea, 1·2 cm. longa; petala obovata, 4 mm. lata, apice oblique biloba, basi in tubum circiter 2 mm. longum

coalita. *Carpella* circiter 12, 4·5–5 mm. longa, birostrata, dorso stellato-ciliata, rostris 2 mm. longis.

Argentina. Dep. Andalgalá; 30.III.1916, *P. Jörgensen* 1345 (Mus. Nac. Hist. Nat. Buenos Aires, 3097).

Nototriche caesia *A. W. Hill*, sp. nov.; *N. Hieronymi* A. W. Hill affinis, sed foliis infra subglabris lobis utrinque subglabris rostris carpellorum longioribus praecipue differt.

Fruticulus parvus, depressus, caespitosus, pulvinatus; caudex subterraneus, lignosus, firmus. *Folia* arcte aggregata; petiolus circiter 1·5 cm. longus, supra vaginam utrinque minute tomentosus; stipulae petiolo supra medium adnatae et cum eo quasi vaginam latam formantes, parte libera lanceolata circiter 5 mm. longa, marginibus uti vagina longe stellato-tomentosae; lamina valde 5-loba vel 5-secta, circiter 6 mm. longa et lata, infra glabra vel subglabra, supra ad basin pulverulento-stellato-tomentosa, lobulis carnosulis glabris; segmenta multilobulata lobulis obovatis, media maxima, 2 exteriora trilobulata. *Flores* petiolo supra medium insidentes, breviter pedicellati. *Calyx* 7 mm. longus, extra glaber, lobis 3 mm. longis triangularibus intus hirsutis. *Corolla* caerulea (teste *Rodriguez*), 1·1 cm. longa; petala oblongo-ovata, apice inaequaliter biloba, basi in tubum 2·5 mm. longum coalita. *Stamina* in caput globosum disposita. *Carpella* 5 mm. longa, birostrata, dorso longe stellato-ciliata, rostris circiter 2·5 mm. longis.

Argentina. Prov. Tucuman: El Pelado, 19.III.1912, *Rodríguez* 443 (Mus. Nac. Hist. Nat. Buenos Aires 3099).

Malvastrum tuberculatum *A. W. Hill*, sp. nov.; *M. nubigenae* Baker fil. affinis, sed foliis paullo sectis basi auriculatis, carpellis dorso tuberculatis praecipue differt.

Fruticulus depressus; caudex subterraneus, lignosus, firmus. *Folia* rosulata, solo appressa; petiolus 3·5–4 cm. longus, supra sparse pilosus; stipulae petiolo adnatae et cum eo quasi vaginam membranaceam 7 mm. longam formantes, parte libera membranacea lanceolata 8–10 mm. longa glabra; lamina ambitu suborbicularis, basi auriculata, circiter 1·5 cm. longa, 1–1·3 cm. lata, 7–9-lobata lobis paullo et irregulariter crenato-lobatis vel -sectis, supra glabra infra ad nervos tantum sparse pilosa. *Flores* solitarii pedunculis sparse pilosis vel glabris; involucrum persistens prophyllis tribus 4–5 mm. longis linearibus glabris. *Calyx* 8 mm. longus, extra glaber, segmentis 5 mm. longis intus dense stellato-pubescentibus. *Corolla* 1·5 cm. longa; petala obovata, 8 mm. lata, basi hirsuta, in tubum circiter 1 mm. longum coalita. *Stamina* in caput globosum disposita, columna 4 mm. longa. *Carpella* reniformia, 2·5 mm. longa, dorso tuberculata.

Argentina. Dep. Andalgalá (Catamarca), 30. III. 1916, *P. Jörgensen* 1346 (Mus. Nac. Hist. Nat. Buenos Aires 3098).

Malvastrum Fiebrigii Ulbrich. Salta, Cerro de Cajón, La Laguna ; 9.II.1914, Rodriguez 1303 (Mus. Nac. Hist. Nat. Buenos Aires, 3096).

Nototriche famatinensis A. W. Hill. La Rioja, Sierra Famatina, Alto Blanco ; 20.I.1928, Castellanos 28/236c. Catamarca, Chucula ; 1.II.1930, Castellanos 30/555.

N. aff. *famatinensi* A. W. Hill. La Rioja, Sierra Famatina, Alto Blanco ; 20.I.1928, Castellanos 28/236A, B.

N. Niederlinii A. W. Hill. La Rioja, Sierra Famatina, Alto Blanco; 20.I.1928, Castellanos 28/235.

N. pulvilla A. W. Hill. Salta, Cerro del Cajón, La Laguna ; 14.II.1914. Rodriguez 1358 (Mus. Nac. Hist. Nat. Buenos Aires, 3095).

N. rugosa A. W. Hill. Catamarca, Juntas de Panizo ; 4.II.1930, Castellanos 30/556.

N. transandina A. W. Hill. San Juan, Valle del Cura Las Máquinas ; 3.I.1930, Pérez Moreau 30/128. San Juan, Cordillera de Vacas Heladas ; 8.I.1930, Pérez Moreau.

LXII—CONTRIBUTIONS TOWARDS A FLORA OF BRITISH NORTH BORNEO : III.*

The previously known distribution of each plant is given between its name and its distribution in British North Borneo.

Xanthophyllum ellipticum *Korth.* [Polygalaceae].

Dutch Borneo.

Mempakul plain, Kg. Manggis, fls. pink, March, *Goklin* in Herb. For. Dept. 2278. " 30 ft. high, 10 in. girth."

Dusun name : *Keramundoi.*

Pyrenaria parviflora *Ridley*, sp. nov. [Theaceae] ; a *P. Kunstleri* King, cui affinis, foliis chartaceis sparse hirtis, rainis petiolis decurrentibus differt.

Small *tree* ; twigs angulate, glabrous, with decurrent ribs from the bases of the petioles. *Leaves* chartaceous, lanceolate, acutely acuminate, base gradually attenuate, glabrous above, midrib impressed above, midrib and 9 pairs of nerves raised below and sparsely rigidly appressed-hairy, the nerves anastomosing near the serrate margins ; petioles 5–7 mm. long, pubescent. *Flowers* small ; pedicels thick, 4 mm. long, silky-velvety. *Bracts* ovate-rotundate, 2 mm. long, velvety. *Sepals* ovate-rotundate, 5 mm. long, silky. *Petals* and *stamens* not seen. *Ovary* ovoid, densely white silky ; style rather stout, glabrous ; stigma 5-lobed, lobes linear. *Berry* subturbinate, 2 cm. diam., glabrous, 5-celled. *Seeds* 5, elliptic, pale brown.

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*Continued from *K.B.* 1932, 295.

Elphinstone Province, Tawao, *Elmer* 21148.

Merrill suggests that this plant is *P. Kunstleri* King, of the Malay Peninsula, which certainly resembles it in its small flowers, but the leaves are thinner and sparsely hairy and the nervation is quite different. The ribs running down the branches from one node to the other are also an important distinction.

Boschia oblongifolia *Ridley*, sp. nov. [Bombacaceae]; a *B. acutifolia* Mast., cui affinis, foliis majoribus oblongis vix cuspidatis, nervis supra depressis, floribus majoribus differt.

Tree. Leaves coriaceous, elliptic-oblong, acute, base obtuse, 9·5–15 cm. long, 4–6·5 cm. wide, smooth above, scaly below, nerves 9 pairs, depressed above; petioles 5–15 mm. long. *Flowers* axillary, pedicels 5 mm. long, angular, scaly. *Sepals* 4, ovate, obtuse, 1·2 cm. wide, scaly, pubescent within. *Stamens* 4, narrowed from a broad base, 5 mm. long, anthers 4–6, usually 4; staminodes several. *Ovary* oblong, furnished with stellate hairs.

Mount Bungal, fls. Dec., *Mrs. M. S. Clemens* 11218.

This is very distinct in the oblong-elliptic leaves with depressed nerves.

Sterculia Burbidgei *Stapf* MS., sp. nov., a *Ridley* descripta [Sterculiaceae]; a *S. Pearsonii* Merrill, cui affinis, floribus multo majoribus, calyce urceolato vix subgloboso, paniculis majoribus laxis differt.

Small *tree*. Bud *scales* and *stipules* several, coriaceous, lanceolate, acute, dentate towards the apex, margins hairy, papillose on the back, 3 cm. long, 5 mm. wide. *Leaves* decurrent, coriaceous, oblanceolate, cuspidate (cusp 2 cm. long), 23–39 cm. long, 6·5–12·5 cm. wide, glabrous above except the midrib, hairy below on the raised midrib and 21 pairs of nerves; young leaves uniformly tomentose on the lower surface, transverse anastomosing nervules raised; petioles thick, 1 cm. long, hairy. *Panicles* large, lax, 38 cm. long, branches 4–5 cm. long, rufous-hairy; pedicels 2 mm. long, rufous-hairy. *Male flowers*: *Calyx* urceolate, densely velvety, 1 cm. long, white-pilose within, lobes 5, linear. *Anthers* 5 in a capitulum, oblong, incurved, glabrous. *Female flowers*: *Calyx-lobes* short. *Ovary* densely hairy. *Style* prominent, densely hairy, stigmas recurved, glabrous. *Follicles* 5, lanceolate, cuspidate, velvety outside, 12 cm. long, 4 cm. wide (when dry). Seeds oblong, black, 1·8 cm. long.

Koung, *Burbidge*. Also in Sarawak: Kuching, *Haviland* 2229 (type in Herb. Kew.), " inflorescence red "; Miri, *Haviland & Hose* 2171; *Beccari* 3153; *Haviland* 736.

This species is undoubtedly allied to *S. Pearsonii* Merr. of Banguey Island and British North Borneo (Kabu China, *Creagh*) but in that species the panicles are denser and the flowers much smaller.

Sterculia Clemensiae *Ridley*, sp. nov. [Sterculiaceae]; a *S. obovata* Merrill, cui affinis, foliis angustioribus, floribus minoribus differt.

Tree; young twigs rufous-velvety. *Leaves* chartaceo-coriaceous, obovate, shortly cuspidate, base attenuate, obtuse, 10–13 cm. long, 4–7 cm. wide, glabrous above except the midrib, stellate-hairy below, midrib and nerves densely rufous-tomentose, nerves 8 pairs, raised, transverse anastomosing nervules raised; petioles 1·5 cm. long, rufous-tomentose. *Panicles* slender, 7–8 cm. long, rufous-tomentose, branches short. *Male flowers*: *Calyx* urceolate, 5 mm. long, hairy, lobes linear, incurved, 4 mm. long, hairy. *Androecium* minute; anthers 4, oblong, incurved. *Female flowers* not seen. *Follicles* lanceolate, apex subacute, 5 cm. long, 4 cm. wide, rufous-velvety; seeds 5, oblong.

Kiau, Mt. Kinabalu, fls. Nov., *Mrs. M. S. Clemens* 10094.

Sterculia megistophylla *Ridley* [Sterculiaceae].

W. Sumatra.

Hill at Kg. Anoman, 30 ft., fls. yellow, March, *Melegrito* in Herb. For. Dept. 2265, "60 ft. high, 3 ft. girth, used for building." Kadayan name: *Biris merah*.

Pterospermum Stapfianum *Ridley*, sp. nov. [Sterculiaceae]; a *Pt. Blumeano*, cui affinis, foliis majoribus oblongis subcordatis subpeltatis, floribus multo majoribus differt.

Large *tree*; branchlets ferruginous-tomentose. *Leaves* subcoriaceous, oblong, shortly cuspidate, base obliquely cordate or subcordate, subpeltate, 7–13 cm. long, 4·5–6 cm. wide, glabrous above, ferruginous-tomentose below, nerves 8 pairs, slender; petioles 5 mm. long, densely tomentose. *Flowers* axillary, large, pale-yellow; pedicels 1·5 cm. long. *Sepals* 5, linear, acute, 6 cm. long, 4 mm. wide, ferruginous-furfuraceous without, grey-velvety within. *Petals* obovate, clawed, apex rounded, 5 cm. long, 2·5 cm. wide. *Stamens*: filaments slender, 2 cm. long; staminodes subequal. *Gynophore* 1 cm. long. *Ovary* conical, flavous-hairy; style 3 cm. long, hairy at the base. *Capsule* terete, oblong, papillose, glabrous, fuscous, 9 cm. long.

Tuskayo, fls. April, *Creagh*; without precise locality, *D. D. Wood* 2253. Also elsewhere in Borneo: Rejang Belaga, fls. Nov., *Haviland* 2125 (type); Sarawak, *Beccari* 3811; Baram, fls. April, *Hose* 590; Banjermasin, not rare in wet places, *Motley* 945, "tall tree, flowers light yellow; the leaves on young plants are palmate and often 6 inches in diameter."

Korthals described a species from Borneo under the name of *Pt. elongatum*, but so incompletely that it is unrecognisable. It is possible that he intended this plant, but it is quite uncertain.

Grewia antidesmifolia *King* var. **hirsuta** *King* [Tiliaceae].

Perak, Malay Peninsula.

Hill at Kg. Anoman, fls. white, March, *Melegrito* in Herb. For. Dept. 2267. "50 ft. high, 2 ft. 6 in. girth, used for building purposes." Kadayan name: *Damak-Damak*.

Microcos Creaghii *Ridley*, sp. nov. [Tiliaceae] ; affinis *M. stylocarpae* Warb., foliis minoribus subtus hirtis, nervis paucioribus, paniculis axillaribus gracilibus differt.

Tree ; branchlets glabrous. *Leaves* coriaceous, elliptic-oblong, apex acute, base obtuse, 6–12 cm. long, 4–5 cm. wide, glabrous above, hairy on the raised midrib and 5 pairs of nerves below ; petioles 1 cm. long, hairy. *Panicles* axillary, racemiform, slender, 6 cm. long, branches 1 cm. long, stellate-hairy ; bracts linear-oblong, 2 mm. long ; pedicels 2 mm. long. *Sepals* cucullate, oblong, obtuse, 1·5 mm. long, tomentose, glabrous within. *Petals* broadly obovate, half as long as the sepals, bearded within. *Stamens* about 30, glabrous. *Ovary* ovoid, glabrous.

Sandakan, fls. May, *Creagh.*

Microcos reticulata *Ridley*, sp. nov. [Tiliaceae] ; a *M. globulifera* Burr., cui affinis, differt foliis ovatis acuminatis majoribus, ramis paniculis et nervis dense hirsutis, stipulis lobatis glabris.

Shrub or small tree ; branchlets densely rufous-tomentose with stellate hairs. *Leaves* chartaceous, lanceolate-ovate, long-acuminate, base rotundate, 18–21 cm. long, 9–10·5 cm. wide, glabrous above, copiously stellate-pilose below, midrib and 10 pairs of nerves raised and rufous-tomentose, secondary transverse nerves and reticulations raised ; petioles stout, 1 cm. long, rufous-tomentose ; *stipules* 4–6-lobed, lobes linear, thick, 3 mm. long, subglabrous. *Panicles* axillary, 10 cm. long, densely rufous-tomentose ; *bracts* linear, 4 mm. long, silky ; *pedicels* 2 mm. long. *Sepals* cucullate, linear-oblong, 5 mm. long, densely silky, pubescent within. *Petals* linear-lanceolate, 3 mm. long, glabrous except the pubescent base. *Stamens* up to 60 ; filaments red. *Gynophore* short, hairy. *Ovary* subovoid, densely hirsute, 5-locular.

Without locality, *Creagh* (type in Kew Herb.). Also in Sarawak, Gunong Pensaung, *Anderson* 160.

Undoubtedly allied to *M. globulifera* Burret, but differing in the very densely hairy branches and underside of leaves and ovary. The panicles too are larger and less branched and the stipules are longer and nearly glabrous. The leaves in Anderson's specimen are oblong and the whole plant subglabrous. It has glabrous pyriform fruits, 2·5 cm. long and 1 cm. through, and is possibly distinct.

Erioglossum rubiginosum *Bl.* [Sapindaceae].

Various parts of the Malayan Region.

In Mempakul plain at Kg. Bundu, fls. white, March, *Goklin* in Herb. For. Dept. 2280, " 20 ft. high, 4 in. girth ; fruit edible." Dusun name : *Berbogon.*

SAPINDACEAE.

Otophora glandulosa *Radlk.* MS., sp. nov., a *Ridley* descripta [Sapindaceae] ; *O. erythrocalyci* Hiern affinis, sed foliis longioribus, floribus et fructibus multo minoribus, antheris sericeis differt.

Shrub or small tree. *Leaves* up to 7-jugate, petiole 19 cm. long, glabrous. *Leaflets* alternate or subopposite, subcoriaceous, elliptic-lanceolate, shortly acuminate, base cuneate, 35 cm. long, 10 cm. wide ; primary nerves up to 6 pairs, raised below, secondary nerves and reticulations conspicuous below ; petiolules thick, transversely rugose, 1 cm. long. *Panicle* elongate, 37 cm. long, glabrous ; rhachis obscurely angled, branches straight, slender, lowest 18 cm. long. *Flowers* small, numerous, glomerate, glabrous. *Pedicels* 3 mm. long. *Sepals* 4, rotund. *Petals* 4, obovate, much smaller. *Stamens* 8 ; anthers oblong, silky. *Pistil* glabrous, oblong, stigma sessile. *Drupes* elliptic, subcomplanate, glabrous, 8 mm. long. *Seeds* 1–2, ovoid, 7 mm. long.

Sandakan, *Creagh* (type) ; Sandakan, Myburgh Province, *Elmer* 20128 ; and probably also Mt. Kalawat, *Mrs. M. S. Clemens* 11175.

This plant is closely allied to *O. erythrocalyx* Hiern of the Malay Peninsula. The leaves, however, are very much longer than any I have seen of that species, the flowers and fruits much smaller and the anthers silky. Radlkofer gave the name to Elmer's sheet 20128, but did not publish a description ; *vide* Merrill, Univ. Cal. Publ. Bot. **15,** 172.

Semecarpus lanceolatus *Ridley*, sp. nov. [Anacardiaceae] ; *S. albescenti* Kurz affinis, foliis lanceolatis acuminatis, floribus majoribus distincta.

Tree, branchlets velvety-hairy. *Leaves* lanceolate, shortly acute, base acuminate, 18–21 cm. long, 3·5 cm. wide ; subcoriaceous, glabrous above, below the 18 pairs of nerves raised and hairy, midrib stout, raised ; petioles 1–1·4 cm. long, thick. *Panicles* lax, 30 cm. long, velvety, branches remote, patent, 11 cm. long. *Flowers* solitary or few aggregated ; pedicels hairy, 2 cm. long. *Calyx* obconic, hairy, lobes triangular, acute 1 mm. long. *Petals* 5, lanceolate, acute, 2 mm. long, silky without. *Stamens* much shorter. *Ovary* globose, hairy.

Tawan, East Coast, near beach, *Creagh.*

Saraca crassifolia *Ridley*, sp. nov. [Caesalpiniaceae] ; a *S. palembanica* Miq., cui affinis, foliis majoribus crasse coriaceis, bracteis multo minoribus, corymbis densioribus brevioribus, pedicellis longis differt.

Tree. *Leaves* 2–5-jugate ; leaflets opposite, coriaceous, oblong or oblong-lanceolate, subacute, base narrowed or rounded, subcordate, 30–38 cm. long, 9–13 cm. wide, midrib and 15 pairs of nerves raised on both faces ; petiolules stout, 1 cm. long, rugose. *Corymbs* axillary, 4–5 cm. long, glabrous, branches slender. *Bracts* lanceolate, acute, 1 mm. long. *Peduncles* 1 cm. long. *Bracteoles* oblong-rotund, 5 mm. long. *Pedicels* 5 mm. long, slender. *Calyx* orange-yellow, tube cylindric-urnshaped, 1 cm. long, lobes oblong-rotund, 5 mm. long. *Stamens* 4 or 5 ; filaments slender, 1·5 cm. long. *Ovary* 7 mm. long, glabrous ; style short.

Sandakan and Myburgh, *Creagh.* Also in Sarawak: Kuching, *Haviland* 1825 (type in Kew Herb.), "calyx and bracts orange-yellow, disc red, style short, curved"; *Haviland & Hose* 3619; *Beccari* 749. Malay Peninsula: Perak, Larut, *Kunstler* 5511.

This plant has been referred to *S. macroptera* Miq. by various authors and is the *S. macroptera* var. *parviflora* Prain, based on the Perak plant quoted above, which appears to be identical with the Bornean plant, though the flowers seem to be smaller, probably because the corymbs are not fully developed. Kunstler describes it as a tree 30–40 feet tall, leaves glossy light green, leaflets eight to ten pairs. Flower a rich bright yellow. In *S. palembanica* Miq., which it most resembles, the leaves are thinner, the corymbs are more wide-spreading and lax, the pedicels of the flowers 3 cm. long.

Saraca Elmeri *Ridley*, sp. nov. [Caesalpiniaceae]; a *S. Zollingeriana* Miq., foliolis oblongis obtusis, floribus minoribus differt.

Tree. Leaves 3-jugate; leaflets coriaceous, oblong, obtuse, base rotund, 10–18 cm. long, 5–7 cm. wide, midrib and 14 pairs of nerves puberulous below, secondary nerves and reticulations raised below; petiolules stout, 4 mm. long. *Corymbs* axillary, 4–5 cm. long, glabrous, branches slender, congested. *Bracts* lanceolate, acute, margins ciliate; bracteoles subopposite, subsimilar, 5 mm. long, 2 mm. wide. *Calyx-tube* cylindric, 9 mm. long, glabrous, lobes oblong, obtuse, 5 mm. long, 2 mm. wide. *Stamens* 4; filaments 1·5 cm. long. *Ovary* stipitate, hairy on the back; style filiform, 7 mm. long.

Elphinstone Province, Tawao, *Elmer* 20707.

Referred by Merrill to *S. triandra* Baker, from which it is altogether different. It is allied rather to *S. Zollingeriana* Miq., but differs in the oblong, obtuse leaves and smaller flowers.

Pithecellobium Elmeri *Ridley*, sp. nov. [Mimosaceae]; a *P. microcarpo* Benth., cui affine, foliolis multo majoribus, paniculis ferrugineis nec hirtis, floribus multo minoribus, legumine multo majore differt.

Tree; branchlets lenticellate, rufous-puberulous. *Leaves* 15–16 cm. long; rhachis sparsely puberulous; leaflets 3 pairs, opposite, chartaceous, elliptic, obtusely acuminate, base narrowed, usually oblique, 7·5 cm. (lower) –11 cm. (terminal) long, glabrous above except the midrib, sparsely pubescent below, nerves 7 pairs, pubescent below; petiolules stout, 3 mm. long. *Panicles* terminal, laxly many-flowered, 16 cm. long, rufous-velvety; branches 5–7 cm. long. *Bracts* lanceolate, 2 mm. long, rufous-velvety. *Flowers* subsessile, 3–4 congested at the tips of the branchlets. *Calyx* campanulate, 1 mm. long, hairy, lobes 5. *Corolla* campanulate, 4 mm. long, pubescent, lobes 5, subacute. *Stamens* many, 4 mm. long. *Legume* contorted, undulate, 9 cm. long, 1 cm. wide, red, glabrous; seeds 9–12, elliptic, 8 mm. long, black.

Myburgh Province, Sandakan, *Elmer* 20182, 20290 (type in Kew Herb.), 20324. Also Sarawak, near Kuching, *Haviland* "d.q.e.b."

Pithecellobium Havilandii *Ridley*, sp. nov. [Mimosaceae]; a *P. lobato* Benth, cui affine, foliolis latioribus ovatis, panicula ferruginea, floribus paucioribus, corolla longioribus differt.

Tree; branchlets lenticellate. *Leaves* 2- or 3-jugate, 14 cm. long; leaflets subcoriaceous, alternate, ovate or obovate, obtuse or obtusely cuspidate, base narrowed, oblique, 8–10 cm. long, 4–7 cm. wide, glabrous, reddish-brown below, 5 pairs of nerves raised, inarching, secondary nerves and transverse nervules few and raised below; petiolules stout, 2 mm. long. *Panicles* 6–7·5 cm. long, rufous-furfuraceous, branches few, remote, 2–5 cm. long. *Flowers* sessile, 5–8 congested at the tips of the branchlets, 1 cm. long. *Calyx* urceolate, 2 mm. long, pubescent, lobes 5, triangular, short. *Corolla* tubular, 4 mm. long, pubescent, lobes ovate, short. *Stamens* numerous, 8 mm. long.

Ulu Tawaran, 2000 ft., in young jungle, *Haviland* 1369.

Stapf in Trans. Linn. Soc. Bot. **4,** 144, refers this to *P. bigeminum* Mart., whilst Merrill refers it to *P. lobatum* Benth. It does not seem to me to be either of these species. The former appears to be confined to India.

Kandelia candel *Merr.* [Rhizophoraceae].

Malayan Region generally.

Nabahan River, *Melegrito* in Herb. For. Dept. 2263. Vernacular name: *Lingg-jong.*

Terminalia Creaghii *Ridley*, sp. nov. [Combretaceae]; a *T. citrina* Roxb. var. *malayana* King, cui affinis, differt nervis conspicue elevatis, nervulis transversis copiosis tenuibus parallelis, paniculis terminalibus, calycis lobis minimis obscuris.

Glabrous *tree. Leaves* coriaceous, opposite, oblong or elliptic, cuspidate, cusp obtuse, mucronulate, base obtuse or rotund, 10–12 cm. long, 3–5 cm. wide, glabrous, shining, 10–11 pairs of nerves and numerous transverse nervules raised below; petioles 1 cm. long, scabrid. *Panicles* terminal, 7–9 cm. long, pubescent. *Flowers* numerous, subsessile. *Calyx* broadly campanulate, 2 mm. long, 3 mm. wide, puberulous, woolly within, teeth short, obscure. *Stamens* 10; filaments terete, narrowed upwards, 4 mm. long, glabrous; anthers oblong. *Style* terete, slightly longer.

Kinabatangan, *Creagh.*

Eugenia incarnata *Elmer* [Myrtaceae].

Philippine Islands.

Kuala Merontongan, in second growth forest at 22 ft., frt. May, *Lumau* in Herb. For. Dept. 1958, "22 ft. high, 3 in. girth, frt. white when ripe; used for building." Brunei name: *Jambu keresek.*

The specimen agrees with Elmer's and with the description except in the colour of the fruit; perhaps the fruit was not really ripe.

Sonerila Gibbsiae *Ridley*, sp. nov. [Melastomaceae]; species pumila *S. pictae* Korth. affinis, staminibus brevioribus differt.

Glabrous *herb*, 7–10 cm. high. *Leaves* herbaceous, ovate, symmetric, obtuse, base rounded, 3–5 cm. long, 1–3·5 cm. wide, usually furnished with white dots, margins serrulate, nerves 2–3-paired; petioles 5–10 mm. long. *Flowers* 8, secund, small. *Calyx* urn-shaped, 4 mm. long, teeth obtusely triangular, short. *Petals* lanceolate, acuminate, 5 mm. long, pink. *Stamens* 3; anthers acutely acuminate, sagittate. *Capsule* urceolate, quadrangular, smooth, 5 mm. long, 3 mm. wide at the apex, base narrowed into a pedicel 5 mm. long.

Tawaran river, 2500 ft., *Haviland* 1284; Sandakan, *Creagh*; Dent Province, between Apiou-Apiou and Tamburan, *Miss L. S. Gibbs* 2985 (type in Kew Herb.), " flowers pink, leaves pinkish with undersides red, with or without white veins down the centre "; Mount Kalawat, *Mrs. M. S. Clemens* 11183.

Memecylon caloneuron *Miq.* [Melastomaceae].

Malay Peninsula and Islands including Sarawak and Dutch Borneo.

Mempakul hill, Kg. Manggis, fls. white, March, *Goklin* in Herb. For. Dept. 2279, " 21 ft. high, 4 in. girth." Dusun name: *Merbinga.*

Memecylon paniculatum *Miq.* [Melastomaceae].

Malay Archipelago.

Kota Klias plain, buds July, *Goklin* in Herb. For. Dept. 2254. " 50 ft. high, 10 in. girth." Bisaya name: *Lumbai Andu.*

Schefflera elliptica *Harms* [Araliaceae].

Dutch Borneo.

Mangsod hill, fls. white, May, *Goklin* in Herb. For. Dept. 2253, " leaves medicinal."

Arthrophyllum Havilandii *Ridley*, sp. nov. [Araliaceae]; ab *A. congesto* Ridley, cui affinis, differt foliis lanceolatis acuminatis, pedicellis multo longioribus.

Glabrous *tree* 4 mm. high. *Leaves* bipinnate, 2·5 m. long; pinnae 3-foliolate, opposite, 14 cm. long; leaflets lanceolate, obtusely acuminate, base narrowed, 8–10 cm. long, 2–3·5 cm. wide, nerves 5 pairs, slender, curved; 4 simple leaves, similar to the leaflets, 4–7 cm. long, borne at the nodes; lateral petiolules 5 cm. long, terminal 2·5 cm. long. *Panicles* with stout peduncles 15 cm. long, 4 mm. diam.; branches stout, umbellate, 7 cm. long, rufous-purple upwards. *Flowers* up to 30 in an umbel; pedicels 5 mm. long. *Calyx* obconic, 2 mm. long, margins sinuate, firm. *Petals* 5, ovate-oblong, obtuse, 3 mm. long. *Stamens* 5; anthers oblong, large. *Style* short.

Kinabulu, Tampassuk, Kiau, 3500 ft., *Haviland* 1254, " 12 feet tall, leaves up to 5 feet long."

I have seen only one of the smaller upper leaves, which is about 15 inches long. This plant is called *A. diversifolium* Bl. by Stapf in his account of the Kinabalu collections, but that species appears to be strictly confined to Java.

Actinodaphne Maingayi *Hook. f.* var. **macrocarpa** *Gamble* [Lauraceae].

Malay Peninsula.

Kg. Anoman, 20 ft., fls. white, March, *Melegrito* in Herb. For. Dept. 2271, " 40 ft. high, 2 ft. 4 in. diam., in hard soil; used for building." Kadayan name: *Pengalaban gala.*

Phoebe opaca *Bl.* [Lauraceae].

Malay Peninsula and Islands.

Kg. Anoman, 40 ft., fls. white, March, *Melegrito* in Herb. For. Dept. 2266, " 50 ft. high, 2 ft. 6 in. girth; used for building." Kadayan name: *Medang lada.*

Ostodes macrophylla *Benth.* [Euphorbiaceae].

Malay Peninsula, Sarawak and Philippine Islands.

Kota Klias plain, fls. white, July, *Goklin* in Herb. For. Dept. 2257, " 27 ft. high, 6 in. girth; used medicinally." Brunei name: *Putat rimba.*

Ficus stolonifera *King* [Moraceae].

Known only from Sarawak.

Sandakan and vicinity, *M. Ramos* 1391, 1887.

LXIII—CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA: XVIII.* N. Y. Sandwith.

Three New Monocotyledons from British Guiana.

Mapanea (Subgen. **Pycnocephala**) **fluviatilis** *Sandwith*, sp. nov. [Cyperaceae]; inter *M. macrophyllam* (Boeck.) Pfeiff. (*M. Schomburgkii* C. B. Clarke) et *M. pycnocephalam* Bth. ponenda; ab illa, cui foliis bracteisque satis similis, culmo haud laevi, spicis castaneis partibusque floralibus multo minoribus primo visu distinguenda; ab hac foliis bracteisque pro rata multo longioribus atque latioribus, glumis squamellisque longioribus, praeterea carina squamellarum lateralium fere laevi sparsissime tantum spinuloso-hispidula differt.

Herba satis elata atque robusta; basis cum radice deest. *Folia* usque 1·13 m. longa, basi vaginali complicata brunneo-purpurascente ad 9–12 cm. longa, 1–2 cm. lata, parte angusta petioloidea circiter 8–9 cm. longa, 3–5·5 mm. lata, tum lamina ipsa 4–6 cm. lata subtus prominenter nervosa apice longe sensim acuminata, marginibus costaque subtus acumen versus ac in acumine ipso crebre pungenti-spinulosis. *Culmus* usque 67 cm. longus (forsan longior), 2·5–5·5 mm. latus, valde trigonus, angulis dimidio superiore et praesertim prope apicem spinuloso-scabridis spinulis nonnunquam detersilibus. *Bracteae* sub capite tres; maxima ima

*Continued from *K.B.* 1933, 400.

foliis similis basi vaginans, 0·6–1·1 m. longa, 4·4–6 cm. lata; secunda atque summa minor magnitudine valde variabili, intermedia nonnunquam anguste elliptica; summa 6–30 cm. longa, 0·35–3·2 cm. lata; omnia ut folia sensim acuminata marginibus apicem versus scabridis. *Caput* 3–4·5 cm. diametro, e spicis castaneis pluribus ut videtur 20–30 constans. *Spicae* ovoideae, 1–1·5 cm. longae, 3–7 mm. diametro. *Glumae* ovato-lanceolatae, dorso lineato-carinatae, 7 mm. longae, 3–3·2 mm. latae. *Squamellae* spiculae 4, 7–7·2 mm. longae; 2 laterales (vel flores masculi) complicato-naviculares, carina dorsali fere laevi sparsissime tantum spinuloso-hispidula (spinulis vulgo 1–2 tantum); squamella posterior anteriorque multo angustior, plana. *Stamina* 2, in squamellis lateralibus inclusa, antheris 2·2–3·5 mm. longis. *Stylus* ramis 2 linearibus ad 3 mm. longis. *Nux* sessilis, obovoideo-subglobosa vel subglobosa, ad 1·2 mm. alta atque diametro, laevis.

British Guiana. Conawarook River, Sept. 1905, *Bartlett* in *Bot. Gard. Herb.* 8242 (typus in Herb. Kew.).

The Conawarook (Konawaruk) River, where several other good plants were collected by Bartlett, flows into the Essequibo River from the south-west, a few kilometres above the confluence of the Essequibo with the Potaro.

In *M. macrophylla* the glumes and squamellae are at least 1 cm. long, and are wider at the base than those of the present species, while their colour in the dried state is a very pale brown.

Mapanea (Subgen. **Pycnocephala**) **insignis** *Sandwith*, sp. nov. [Cyperaceae]; ob bracteas interiores inflorescentiam arcte includentes, spicas inflorescentiae arctissime confertas nec ante florum lapsum oculo distinguendas, nulli speciei americanae affinis, species quasdam africanas potius revocans.

Herba foliis basi late vaginantibus. *Folia* in planta humili (in *Jenman* 972) haudquaquam typica tantum visa, circiter 30 cm. longa, 1·5 cm. lata (in planta bene evoluta verosimiliter multo longiora atque latiora), supra vaginas angustata purpurascentia, marginibus costaque subtus apicem versus pungenti-spinulosis. *Culmus* trigonus, laevis vel angulis nonnunquam apicem versus tuberculis (vel basibus spinularum) hic illic praeditis, nudus vel bractea ima a ceteris 1·5–9 cm. ita sejuncta ut culmus monophyllus videatur. *Bracteae* numerosae, ut videtur 7–8, exteriores longissimae apice longe acuminatae marginibus costaque subtus nisi basin versus spinuloso-scabridis, extima ad 87 cm. longa, 4·2–5 cm. lata; interiores inflorescentiam arcte includentes, breviter late ovatae vel suborbiculares, cuspidatae, intimae inflorescentiam subaequantes. *Caput* 1·5–4·8 cm. diametro, spicis sub anthesi arctissime confertis erectis aequilongis globum singulum formantibus neque singillatim distinguendis, verosimiliter circiter 20. *Glumae* oblongo-lanceolatae, hyalino-membranaceae, 9–11 mm. longae, ad 3 mm. latae, saepe subcurvatae. *Squamellae* spiculae 4, 9–11 mm. longae; 2 laterales complicato-naviculares, carina dorsali ut videtur omnino laevi;

squamella posterior anteriorque multo angustior, plana, utraque nonnunquam cum laterali coalita. *Stamina* 3, in squamellis lateralibus ac anteriore inclusa ; antherae 2·2–3 mm. longae, demum conspicue exsertae. *Stylus* ramis 2 linearibus 4·2–6 mm. longis. *Nux* immatura tantum visa, oblonga, apice in stylum attenuata, vix 1 mm. longa, circiter 0·25 mm. lata, plana.

British Guiana. Potaro River, Oct. 1898, *Jenman* 7478 (typus in Herb. Kew.). In forest below the Kaieteur, Potaro River, Sept.–Oct, 1881, *Jenman* 972.

The inflorescence recalls that of the Tropical African species *M. Diestelii* K. Schum., *M. subcomposita* C. B. Clarke and *M. oblonga* C. B. Clarke.

Carludovica angustissima *Sandwith*, sp. nov. [Cyclanthaceae] ; ad *Sectionem Primam* cl. *Gleasoni* in Bull. Torr. Bot. Club. 56, 2 (1929) pertinens, *C. pygmaeae* Gleason affinis, petiolis multo longioribus, foliorum segmentis longis perangustis, lobis perianthii masculi triangulari-lanceolatis insigniter glanduloso-punctatis differt ; a *C. insulari* Gleason atque *C. nana* Gleason inter alia foliorum segmentis perangustis, staminibus paucioribus distinguenda.

Herba terrestris, foliis basalibus secus caudicem circiter 4–6 cm. longum arcte dispositis. *Folia* 14–15, ut videtur recta, basi ipsa breviter late vaginantia, tum petiolis circiter 26–28 cm. longis ad 2 mm. latis rigidis supra canaliculatis acutissime marginatis subtus obtuse carinatis praedita ; lamina circiter 3–4 cm. supra basin bipartita, segmentis linearibus perangustis apicem versus longe attenuatis 24–30 cm. longis 5·5–7 mm. tantum latis. *Pedunculi* evidenter complures, graciles, 9·5–20 cm. longi. *Spathae* 4 (an semper ?) apicales ; 2 exteriores lanceolatae, sensim longe acuminatae, 1·9–3·5 cm. longae, extima nonnunquam pedunculo 2–3 mm. infra apicem affixa ; 2 interiores spadicem includentes ovatae, ad 1·7 cm. longae, circiter 8 mm. latae, apice acumine vel cuspide 3–5 mm. longa praeditae. *Spadix* 0·8–1·2 cm. longa, 4–8 mm. diametro. *Flores masculi* huius sectionis typici ; pedicelli late complanati, circiter 0·5 mm. longi atque 0·8 mm. lati ; perianthium fere planum, 1·8–3 mm. diametro, ut videtur semper 5-lobum ; lobi inaequales, anguste triangulari-lanceolati, apice ipso obtusiusculo, 0·5–0·8 mm. longi, maculis brunneis insigniter copiose glanduloso-punctati ; discus centralis lobis rotundatis vel truncatis quam lobis perianthii multo brevioribus circiter 0·3 mm. longis atque 0·5 mm. latis ; stamina 4–8, lobis disci per filamenta gracillima valde obscura vix 0·2 mm. longa affixa, loculis oblongis divergentibus 0·5–0·6 mm. longis. *Flores feminei* sessiles, quadrati, circiter 2·2 mm. longi atque lati ; lobi perianthii 4, erecti, ovario adpressi, truncato-quadrati, 1 mm. alti, 2·2 mm. lati, staminodiis longis filiformibus praediti ; ovarium lobis obovatis, stigmatibus cruciformibus linearibus.

British Guiana. Holmia, Potaro River, Nov. 1907, *Bartlett* in *Bot. Gard. Herb.* 8740 (typus in Herb. Kew.) : on wet rocks in a creek. Holmia is a good locality on the upper Potaro, about 26 kilometres S.S.W. of the Kaieteur Fall.

LXIV—NOTES ON AFRICAN GRASSES: XIV.*

C. E. Hubbard.

Elionurus Trapnellii *C. E. Hubbard*, sp. nov.; affinis *E. Welwitschii* Rendle, sed spiculis sessilibus latioribus, gluma inferiore inter carinas ciliolatas 10–13-nervi differt.

Gramen perenne, dense caespitosum, usque ad 1 m. altum. *Culmi* erecti, validiusculi, leviter compressi, uno latere canaliculati vel inferne applanati, rigidi, 5–7-nodes, ramosi, ramis erectis gracilibus, racemos versus et angulis nodos superiores versus minute scaberuli hic praeterea nonnunquam rigide ciliati, ceterum glabri laevesque. *Folia* subglauca; vaginae teretes, striatae, internodiis breviores, basales subpersistentes, usque ad 14 cm. longae, basin versus pilis longis deciduis laxe pilosae, ceterae glabrae laevesque; ligulae truncatae, brevissimae, glabrae; laminae angustissime lineares, apice tenuiter acutae, usque ad 60 cm. longae, planae vel siccitate convolutae, usque ad 5 mm. latae, rigidiusculae, supra arcte nervosae, pilis minutis pone ligulam exceptis glabrae, marginibus et costa media superne minute scaberulae. *Racemi* usque ad 11 cm. longi, stricti vel leviter flexuosi, pallide virides vel purpureo-tincti; articuli rhacheos lineares, usque ad 4·5 mm. longi, tarde et oblique disarticulati, superne pilis minutis appressis pubescentes; pedicelli articulis subsimiles, sed angustiores, subfiliformes, fere glabri, minute scaberuli. *Spiculae sessiles* plerumque 5–7 mm. longae (callo excluso); callus 1–2 mm. longus, basi rotundata obscure et minutissime barbatus. *Glumae* subaequales; inferior explanata lanceolata vel anguste ovata vel anguste elliptico-ovata, acuminata, apice minute bidentata, dorso glabra, inter carinas obscure 10–13-nervis, carinis angustissime alatis et dense et rigide ciliolatis; superior inferiore paulo brevior, lanceolata, acuta, 3-nervis, carina minutissime pubescente, marginibus obscure et minute ciliolatis. *Anthoecium inferum* sterile: lemma lanceolatum vel anguste oblongo-lanceolatum, acutum, 2-nerve, marginibus minute ciliolatis; palea nulla. *Anthoecium superum* ♀: lemma lemmati anthoecii inferi simile sed 3–3·5 mm. longum et 3-nerve; palea nulla. *Spiculae pedicellatae* illis sessilibus subsimiles sed angustiores et breviores, 4–4·5 mm. longae. *Gluma* inferior lanceolata, apice integra, 6–7-nervis, dorso obscure et minute asperula, altero margine rigide ciliolata, altero scabrida. *Anthoecium superum* ♂. *Antherae* 2–3 mm. longae.

Northern Rhodesia: Mazabuka, Central Research Station, *Albizzia struthiophylla* country, in sandy loam soils, 1140 m., Jan. 1932, *Trapnell* 846 (type), 874.

Brachiaria stipitata *C. E. Hubbard*, sp. nov.; affinis *B. callopo* (Pilger) Stapf, sed culmis et foliis multo brevioribus et gracilioribus, racemis usque ad 4, rhachi glabra, spiculis minoribus differt.

Gramen annuum, gregarium, usque ad 36 cm. altum. *Culmi* erecti, e nodis inferioribus radicantes, siccitate compressi, graciles, basin

*Continued from *K.B.* 1933, 269.

versus ramosi, superne simplices, usque ad 4-nodes, racemos versus tenuiter striati, nodis appresse pubescentes, ceterum glabri laevesque. *Foliorum vaginae* compressae, carinatae, sublaxae, striatae, internodiis longiores, laeves, basales pilis appressis paucis exceptis glabrae vel plerumque totae glabrae ; ligulae ad seriem pilorum minutorum redactae ; laminae lineares, erectae, apice subobtusae, usque ad 10 cm. (vel ultra) longae, arcte conduplicatae et carinatae, explanatae usque ad 5 mm. latae, supra basin versus pilis appressis mollibus paucis exceptis glabrae, marginibus et carina apicem versus minute scaberulae. *Inflorescentia* erecta, usque ad 7·5 cm. longa ; axis primarius scaberulus, inferne dorso rotundatus et striatus, facie canaliculatus vel plerumque totus triqueter. *Racemi* 2–4, simplices, erecti, subsessiles, secundi, dense spiculati, biseriati, 2·8–0·8 cm. longi, inferiores usque ad 3 cm. distantes ; rhachis subtriquetra, usque ad 0·6 mm. lata, dorso subcomplanata, glabra, marginibus scaberulis ; pedicelli solitarii, brevissimi, scaberuli, apice discoidei. *Spiculae* contiguae, dorso late ellipticae vel late elliptico-ovatae, acutae, 3·5–4 mm. longae, turgidulae, stipitatae, stramineae ; internodium inferum (stipes) rhachillae globosum, usque ad 0·5 mm. longum. *Glumae* basi stipiti adnatae ; inferior oblata, subacuta, usque ad 1·8 mm. longa, membranacea, 5-nervis ; superior valde convexa, spiculae subaequilonga et ambitu similis, membranacea, 5-nervis, nervis scabridis, apicem versus transverse nervata, superne minute asperula. *Anthoecium inferum* ♂, spiculae aequilongum : lemma glumae subsimile, dorso longitudinaliter late sulcatum, 5–7-nerve ; palea lemmati aequilonga, apice minute pubescens. *Anthoecium superum* ♀, infero subaequilongum, dorso late ellipticum, subacuminatum, apiculatum, apice minute pubescens : lemma et palea crustacea, nitens, straminea. *Antherae* usque ad 1 mm. longae.

French Guinea : between Mamou and Dalaba, in a swamp. *Chevalier* 34598.

Urochloa geniculata *C. E. Hubbard*, sp. nov. ; affinis *U. brachyurae* (Hack.) Stapf, sed spiculis ovatis vel elliptico-ovatis dense et minute pubescentibus, gluma superiore 7–9-nervi differt.

Gramen annuum, usque ad 80 cm. longum. *Culmi* geniculato-adscendentes, e nodis inferioribus radicantes, simplices vel plerumque basin versus ramosi, usque ad 6-nodes, nodis dense pilosis, nodos versus pilis e tuberculis ortis laxe pilosi, inflorescentiam versus dense pilosi. *Foliorum vaginae* demum internodiis breviores, laxae, striatae, apicem versus carinatae, pilis e tuberculis ortis sublaxe pilosae vel marginibus ciliatis exceptis glabrescentes ; ligulae ad seriem ciliorum densorum redactae ; laminae lineares, basi contractae, apice tenuiter acutae, usque ad 25 cm. longae et usque ad 10 mm. latae, planae, subtenues, virides, pilis e tuberculis ortis laxe pilosae, marginibus cartilagineis scabridis et inferne ciliatis. *Inflorescentia* angusta, 7–10 cm. longa ; axis primarius dense pilosus, inferne semiteres, superne complanatus. *Racemi* 5–6, dense

spiculati, erecti vel leviter patentes, secundi, sessiles vel subsessiles, usque ad 5·5 cm. longi, inferiores 2–2·5 cm. distantes; rhachis dorso plana, circiter 1–1·5 mm. lata, subtriquetra, marginibus ciliolata et pilis longis albis e tuberculis ortis laxe adspersa; pedicelli bini, inaequales, usque ad 1 mm. longi, apice discoidei. *Spiculae* dense imbricatae, ovatae vel elliptico-ovatae, acute acuminatae, 4–5 mm. longae, minute pubescentes, pallide virides. *Glumae* membranaceae, pilis minutis densis e tuberculis minutis ortis pubescentes; inferior lanceolata vel anguste ovata, obtusa vel truncata, 3–4 mm. longa, 5–7-nervis; superior explanata ovata, obtusa, spiculae aequilonga, 7–9-nervis. *Anthoecium inferum* ♂: lemma glumae superiori simile sed dorso planum, acuminatum, 5-nerve; palea elliptica, 4 mm. longa, carinis angustissime alatis. *Anthoecium superum* ♀, dorso late ellipticum, 3–3·3 mm. longum: lemma coriaceum, granulare, rugulosum, mucrone barbellato usque ad 1·5 mm. longo; caryopsis suborbicularis, dorso valde compressa, 2 mm. longa.

Tanganyika Territory: Lake Province, Kwimba District, near dwellings and in cultivated land, *Marshall* 5.

Urochloa novemnervia *C. E. Hubbard*, sp. nov.; affinis *U. brachyurae* (Hack.) Stapf, sed rhachi racemorum glabra vel fere glabra, spiculis majoribus minute pubescentibus, glumis 9–11-nervibus differt.

Gramen annuum, laxe caespitosum, usque ad 30 cm. altum. *Culmi* geniculato-adscendentes, graciles, teretes, infra medium ramosi, ramis suberectis, circiter 4-nodes, striati, nodos versus et internodio supremo (pedunculo) pilis patentibus hirsuti. *Foliorum vaginae* laxae, striatae, apicem versus carinatae, pilis patentibus e tuberculis ortis laxe hirsutae vel superiores marginibus dense ciliatis exceptis glabrae et laeves, inferiores internodiis longiores, superiores demum breviores; ligulae ad seriem ciliorum redactae; laminae anguste lanceolatae, basi abrupte contractae vel leviter rotundatae, in apicem callosum obtusum attenuatae, usque ad 8 cm. longae, 5–10 mm. latae, planae, rigidae, virides, pilis plerumque e tuberculis ortis sparse hirsutae vel glabrescentes, marginibus cartilagineis scaberulis. *Inflorescentia* 3·5–6 cm. longa; axis primarius usque ad 5 cm. longus, inferne semiteres et plus minusve dense hirsutus, superne complanatus, scaberulus, pubescens vel glabrescens. *Racemi* usque ad 5, leviter patentes, stricti vel plerumque flexuosi, simplices, secundi, sessiles vel subsessiles, inferiores usque ad 3·5 cm. longi, superiores breviores; rhachis complanata vel superne triquetra, circiter 1 mm. lata, glabra vel marginibus pilis paucis rigidis longis raro adspersa, marginibus scabrido-ciliolata; pedicelli solitarii vel inferne bini, usque ad 1 mm. longi. *Spiculae* laxe imbricatae vel leviter patentes et contiguae, lanceolatae, anguste ovatae vel ovatae, acute acuminatae, 5·5–6·5 mm. longae, pallide virides, minute pubescentes. *Glumae* chartaceae, pilis minutis densis e tuberculis minutis ortis pubescentes; inferior lanceolata vel late lanceolata vel anguste lanceolato-oblonga, obtusa, 4·5–5·5 mm. longa, arcte

9-nervis, nervis superne anastomosantibus; superior explanata ovata, obtusa, spiculae aequilonga, 9–11-nervis. *Anthoecium inferum* sterile: lemma glumae superiori simile sed dorso planum vel leviter concavum, acuminatum, 5–7-nerve; palea elliptica, obtusa, 4 mm. longa, membranacea, carinis angustissime alatis. *Anthoecium superum* ♀, dorso ellipticum, circiter 4 mm. longum, pallide viride: lemma coriaceum, granulare, rugulosum, mucrone usque ad 1·3 mm. longo; antherae 0·8 mm. longae.

Tanganyika Territory: Lake Province, Kwimba District, *Marshall* 6.

Panicum glaucocladum *C. E. Hubbard*, sp. nov.; affinis *P. membranaceo* Robyns, sed culmis infra medium multum ramosis, laminis lanceolatis, spiculis pubescentibus minoribus differt.

Gramen annuum, usque ad 36 cm. altum. *Culmi* geniculato-adscendentes, e nodis inferioribus radicantes, gracillimi, teretes, usque ad 9-nodes, infra medium multo ramosi, ramis erectis vel patentibus, pruinosi, glabri laevesque, internodiis inferioribus usque ad 2 cm. longis, internodio supremo (pedunculo) usque ad 13 cm. longo. *Foliorum vaginae* internodiis breviores, teretes, laxae, inferiores breviter pilosae, superiores glabrescentes vel glabrae; ligulae ad seriem ciliorum redactae; laminae anguste lanceolatae vel lanceolatae, basi rotundatae, apice acute acuminatae, 1·5–3 cm. longae, 3–9 mm. latae, planae, tenues, tenuiter nervosae, laxe pubescentes, marginibus ad basin ciliatae superne scaberulae. *Panicula* late obovata vel late obovato-elliptica, laxissima, tripinnata, usque ad 9 cm. longa et 6 cm. lata, erecta; rhachis filiformis, longitudinaliter sulcata, laevis; rami oblique patentes, e basi divisi, tenuiter filiformes, laeves, leviter flexuosi, inferiores usque ad 6 cm. longi; ramuli et pedicelli patentes, capillares, laeves: pedicelli 1–7 cm. longi. *Spiculae* ovatae, acutae vel subobtusae, circiter 1·3 mm. longae, breviter pubescentes, pallide virides et purpureo-variegatae. *Glumae* tenuiter membranaceae, pilis brevibus patentibus pubescentes; inferior explanata ovata, acuta, circiter 1 mm. longa, 3-nervis; superior explanata late elliptico-ovata vel late elliptica, obtusa, spiculae aequilonga, 5-nervis. *Anthoecium inferum* sterile: lemma glumae superiori simile sed glabrum; palea elliptica, lemmati aequilonga. *Anthoecium superum* ♀, dorso ellipticum, subacutum, circiter 0·8 mm. longum, albidum: lemma et palea tenuiter papyracea, obscure verruculosa. *Antherae* 0·5 mm. longae.

Sierra Leone: near Toma, Bonthe Island, common along sandy roads in light shade of oil palms, Nov. 1931, *Deighton* 2282.

The very small spikelets serve to distinguish this graceful plant from the remaining annual species of the section *Verruculosae* which occur in tropical Africa.

Ehrharta longigluma *C. E. Hubbard*, sp. nov.; a ceteris speciebus differt glumis lemmatibus multo longioribus.

Gramen perenne, caespitosum, 45–50 cm. altum. *Culmi* suberecti vel basi leviter geniculati, graciles, teretes, simplices, 2–3-nodes, nodis pilis minutis appresse pubescentes, internodiis inferioribus minute et obscure puberuli, ceteris glabri et laeves. *Foliorum vaginae* teretes, basales internodiis longiores, obscure et dense puberulae vel demum glabrae, intermediae et superiores internodiis breviores, asperulae ; ligulae truncatae, laceratae, usque ad 1 mm. longae, membranaceae ; laminae lineares, apice obtusae et callosae, usque ad 8 cm. longae et 2 mm. latae, planae vel siccitate involutae, rigidiusculae, dense et minute pubescentes. *Panicula* ambitu ovata, laxissima, 10–13 cm. longa ; rhachis gracillima, flexuosa, laevis ; rami solitarii vel bini, distantes, tenuiter filiformes, flexuosi, simplices, paucispiculati, demum patentes, laeves ; pedicelli subcapillares, laeves, superne leviter incrassati, laterales usque ad 10 mm. longi, terminales usque ad 18 mm. longi. *Spiculae* nutantes, lanceolato-oblongae vel anguste oblongae, 6–7·5 mm. longae, glabrae, inferne purpurascentes et virides, superne flavido-virides. *Gluma* inferior ambitu lineari-lanceolata, obtusa, explanata anguste oblongo-lanceolata, apice rotundata, spiculae aequilonga, firme membranacea, 7–8 nervis ; gluma superior inferiori similis sed paulo brevior. *Lemma sterile inferius* explanatum elliptico-oblongum, apice rotundatum, 3 mm. longum, coriaceum, obscure 3-nerve. *Lemma sterile superius* naviculare, ambitu semi-elliptico-oblongum, apice oblique obtusum, 4 mm. longum, coriaceum, 5-nerve, basi appendiculatum, appendiculis suborbicularibus circiter 0·7 mm. longis. *Lemma fertile* explanatum late ellipticum, apice rotundatum, circiter 3·6 mm. longum, 7-nerve, coriaceum ; palea angusta, lemmati aequilonga, hyalina. *Antherae* 2·5 mm. longae.

Natal : Mont aux Sources, common in grassland on mountain-slopes, 3150 m., Feb. 1926, *Bayer & McClean* 270.

A very distinct species, readily separated from all other species by its long glumes which considerably exceed the florets.

Brachyachne fibrosa *C. E. Hubbard*, sp. nov. ; affinis *B. fulvae* Stapf, sed foliorum laminis angustioribus, spiculis brevioribus, glumis angustioribus differt.

Gramen perenne, dense caespitosum, 30–45 cm. altum. *Culmi* erecti, basi vaginis dense obtecti, gracillimi, teretes, simplices, 2–3-nodes, nodis atrofuscis, glabri laevesque. *Foliorum vaginae* basales basin versus dense sericeo-villosae, ceterum glabrae laevesque, in fibras demum fissae, ceterae internodiis breviores, arcte appressae, tenuiter striatae, ore pilis brevibus exceptis glabrae laevesque ; ligulae truncatae, brevissimae, glabrae ; laminae anguste lineares vel filiformes, tenuiter acutae, inferiores usque ad 14 cm. longae, ceterae multo breviores, arcte convolutae vel involutae vel explanatae et usque ad 1·5 mm. latae, rigidae, virides, supra basin versus pilis paucis longis exceptis glabrae laevesque. *Racemi* 3–5, digitati, spiciformes, stricti, demum patentes, 2·5–3·5 cm. longi, graciles, a basi spiculigeri, fulvi ; rhachis gracillima, dorso applanata, 0·5 mm.

lata, marginibus minute scaberulis ; pedicelli minutissimi. *Spiculae* arcte imbricatae, alternae, appressae, anguste oblongae, demum hiantes, lateraliter valde compressae, 3·5-4 mm. longae. *Glumae* subaequales, angustae, carinatae, membranaceae, uninerves, glabrae; inferior spiculae aequilonga, explanata lanceolata vel anguste oblongo-lanceolata, obtusa, carina minute scaberula ; superior inferiore paulo brevior, explanata anguste elliptico-oblonga, apice rotundata, carina superne minute scaberula. Lemma carinatum, explanatum elliptico- vel ovato-oblongum, usque ad 3 mm. longum, apice truncatum vel leviter emarginatum, 3-nerve, nervo medio in mucronulum usque ad 0·3 mm. longum excurrente, e nervis molliter ciliatum, tenuiter membranaceum ; palea angusta, lemmate paulo brevior, glabra, carinis minute scaberulis ; rhachilla usque ad 1·5 mm. longitudinem producta.

Tanganyika Territory : Iringa Province, Msima Stock Farm, common in patches on hillsides, 1932, *Emson* 349.

The genus *Brachyachne* is now represented in tropical Africa by four species. *B. fulva* Stapf and *B. fibrosa* C. E. Hubbard have digitate spikes, whilst **B. obtusiflora** (*Benth.*) *C. E. Hubbard*, comb. nov. (*Microchloa obtusiflora* Benth.) and **B. patentiflora** (*Stent et J. M. Rattray*) *C. E. Hubbard*, comb. nov. (*Microchloa patentiflora* Stent et J. M. Rattray) have solitary spikes.

LXV—MISCELLANEOUS NOTES.

Sixth International Botanical Congress, 1935. The dates of the Congress have been altered and are now September 2nd-7th, 1935. A preliminary notice has already been sent to a number of botanists. Additional copies can be obtained from the Secretary, Dr. M. J. Sirks, Wageningen, Holland.

Ulmus campestris *Linn.* Article 67 of the " British Proposals," which was adopted at the Fifth International Botanical Congress at Cambridge in 1930, states that " A name of a taxonomic group must be rejected if, owing to its use with different meanings, it becomes a permanent source of confusion or error." A list of names to be rejected for this reason (*nomina ambigua*) is to be drawn up and appended to the Rules as Appendix V.

In Notes from the Univ. Herb. Cambridge, No. 4, in Journ. Bot. **70,** Suppl. p. 23 (1932) we stated that, in our opinion, " *U. campestris* should be abandoned as a *nomen confusum*." (The term *nomen ambiguum* should have been used instead of *nomen confusum*, which applies to a group whose characters are " derived from two or more entirely discordant elements.") We put forward this view because we considered that the name *U. campestris* Linn. had been used by a sufficient number of authors in different senses to necessitate its rejection. Thus Ascherson & Graebner, Syn. Mitteleurop. Fl. **4,** 552 (1911) and other continental authors apply it to *U. nitens* Moench ; Sowerby & Smith, Engl. Bot. **27,** t. 1886 (1808) and Smith,

Engl. Fl. **2,** 21 (1824) to *U. minor* Mill. sec. Henry ; Kerner in Oest. Bot. Zeit. **26,** 52 (1876) to *U. glabra* Huds. ; Moss, Camb. Brit. Fl. **2,** 94, tt. 103, 102 (1914), and many British botanists to *U. procera* Salisb. (the English Elm), as was done by Linnaeus in the "Flora Anglica" (but not in the "Species Plantarum") where he cited Ray's reference to *U. vulgatissima folio lato scabro* Goodyer (undoubtedly the English Elm) under the name *U. campestris*. The specimen in the Linnean Herbarium has been referred to *U. glabra* Huds., but may be a hybrid of that species with *U. nitens* Moench. For these reasons we here suggest the name *Ulmus campestris* Linn. for inclusion in the list of *nomina ambigua*. If this is done, the first post-Linnean name of definite application to the English Elm, as has been shown by Rehder in Journ. Arn. Arb. **1,** 138 (1919), is *U. procera* Salisb. Prodr. Hort. Chapel Allerton, 391 (1796).

W. T. S. & J. S. L. G.

Indian Timbers.*—In view of the vast extent and economic importance of the forests of India, the appearance of an authoritative and up-to-date account of 320 of the more important commercial timbers of that country is a matter of considerable interest. Hitherto the standard work on the subject has been the well-known "Manual of Indian Timbers" by J. S. Gamble, but even the most recent edition of that work is in many respects out of date.

The authors state in the introduction that their aim is to bring together all the available information on the uses and qualities of the various timbers, and to make photomicrographs of low and high magnifications generally available, especially to forest officers. The subject matter dealing with the various woods is arranged as in the Genera Plantarum, except that the *Coniferae* are dealt with at the end. Certain other minor alterations have also been made, e.g. the genus *Chloroxylon* has been transferred from the *Meliaceae* to the *Rutaceae* and inserted next to the genus *Aegle*, "a step which is acceptable to systematists and is further borne out by the structure of the wood."

Under each family, general information relating to its woods, distribution throughout the world, significance in the Indian flora, economic importance, and its more salient structural characters is given. The genera and species are similarly treated, the anatomical descriptions under the species being very thorough and complete. There are two keys for the identification of species (based on characters visible with the hand lens and microscope respectively) in genera where more than one species is of sufficient economic importance to have been included in the book. Since there is often considerable variation in the structure of the wood of a single species, it is

*Commercial Timbers of India, their Distribution, Supplies, Anatomical Structure, Physical and Mechanical Properties and Uses. By R. S. Pearson and H. P. Brown. Published by the Government of India Central Publication Branch, Calcutta, 1932. Pp. xliv+1150, 640 photomicrographs, 320 distribution maps. 2 vols. Price £5 net.

perhaps unfortunate that the descriptions of the wood of the different species have, in some instances, been based on a study of a single specimen. The mechanical properties, seasoning, durability, antiseptic treatment, and working qualities, together with the present and prospective uses of the different woods are discussed.

Trade names have, wherever possible, been taken from the list recently issued by the Government of India for use of forest officers, but owing to the fact that timber merchants, and especially those in Europe, have coined names to suit their own purposes, the authors state that they have in many cases experienced great difficulty in assigning names. Vernacular names are given and have been arranged according to the Provinces.

A very important feature of the book, and one which greatly enhances its value, is the illustrations. These consist of a small map showing the distribution of each of the species described, a photograph of a transverse surface of the wood magnified ten times, showing the characters that may be recognised with a hand lens, and one of a transverse section of the wood of each species magnified by 110. It is, however, to be regretted that illustrations of tangential sections have been omitted. These are especially useful when a wood of unknown origin has to be identified.

There is an appendix giving a classification of the timbers according to their uses arranged under thirty-three headings such as " construction and general carpentry," " ship and boat building," " railway sleepers," etc. A second appendix gives a glossary of scientific terms and phrases used in the book. There is also a general bibliography, and the trade, vernacular and scientific names are indexed separately.

The authors, printers and publishers are to be congratulated on having produced a book worthy to become the standard work on Indian timbers, and one which will be indispensable to all who are interested in the structure, properties and uses of wood. C. R. M.

Spices and Condiments.*—There seems to be no precise definition of the distinction between a spice and a condiment. Under the term spice the author includes in this book a variety of dried vegetable products containing essential oils which are used for flavouring food, excluding herbs and aromatic seeds, and decides to use the word condiment to denote " a spice, or other seasoning material . . . added to food after it has been served at table." An idea of the scope of the work is given in the statement: " Although the book has been written primarily for those whose interest in Spices centres in the fact that the flavours of these products enhance the attractiveness of food, whether they be grocers, food and flavouring essence manufacturers, housewives, chefs, or gourmets, it has not been forgotten that Spices are used also as drugs and as perfumes."

*By H. Stanley Redgrove, B.Sc., F.I.C., published by Sir Isaac Pitman & Sons, Ltd., London, 1933. Pp. 361+xviii, illustrated. Price 15*s*.

The principal market of the world for " spices from the East " is London, with Mincing Lane as the business centre, where certain firms who specialize in these pleasant commodities have been established for generations. The history of the trade runs parallel with that of travel and early colonization, centred on the Moluccas or Spice Islands, which were chiefly concerned with cloves, nutmegs and mace. The importance of these Islands began in 1510 when the Portuguese, who included also cinnamon from Ceylon in their commerce, took possession of them. Later, they came in turn under the control, either by force or by treaty, of the Dutch about 1610, the British in 1796, and in 1814 were restored to the Dutch, which nation is still in possession. The British East India Company, when first chartered by Queen Elizabeth in 1600, appears to have relied largely on spices for a revenue. Prior to this the eastern trade overland from India, China, etc., to the Mediterranean in ginger, pepper, cardamoms, cassia bark and various minor spices, such as caraway and coriander, was largely in the hands of the Arabs and Persians, and considerable ignorance prevailed as to the true sources, both botanical and geographical. The great fortunes reported to have been made by the spice merchants of the Classic and Mediaeval Ages were no doubt largely responsible for keeping the sources obscure.

In the first chapter, on " The Philosophy of Spice," the author deals with flavour, taste, medicinal value and other general subjects. In the remainder of the book the plants dealt with are classified under rhizome and root, bark, flower, fruit and seed spices, and information under such headings as history, cultivation and uses is given.

The author discusses the long-standing question of the specific source of " Black Caraway " (" Shiyah Zirah "), a *Carum* that has been of importance in India for a hundred years or more, but little known in this country. The fruit is collected from wild plants for local use in India, Persia, Kashmir and other countries. Similar uncertainty as to the botanical origin has often been met with in the case of products obtained from wild sources or plants not in general cultivation. To quote another instance, the rhizome of the " Lesser Galangal " (*Alpinia officinarum* Hance), though rarely used now, was well-known as a spice during the Middle Ages in Europe, but the plant was not discovered until 1867. Quoting from Ridley (Spices, 439), in the present work the author states that the earliest reference to this spice is that of Ibn Khurdabah, the Arabian geographer, A.D. 869–885, and that the plant was first found by Theophilus Sampson at Tung-sai on the peninsula of Lei-chau-fu, opposite Hainan in the south of China, but apparently only as an escape from cultivation. The specific name given to it by Dr. Hance was first published in the Journal of the Linnean Society in 1872.

An extensive bibliography is added, and it is noticeable that both American and British books on spices are very limited, the present

one being the second published in the United Kingdom. Mr. H. N. Ridley's book, the first of the two, published in 1912 (see Kew Bull. 1912, 353), is, as agreed by the author of the work under review, " a classic work," but Mr. Redgrove's hope that " the present work, in which something approximating to a comprehensive account has been attempted, will satisfy a very real need " shows every promise of being realized. J. H. H.

A Hong Kong Biological Journal.—Under the title of The Hong Kong Naturalist,* a quarterly illustrated journal was commenced in January 1930 for circulation in Hong Kong and South China. The journal, which embraces all branches of natural history, has already covered a wide range of subjects and includes not only notes and semi-popular articles but a number of scientific papers. Some of these are of the nature of critical systematic revisions and recently two supplements, containing the more purely scientific contributions, have been issued separately.

Amongst the papers contributed are two important series on the birds and fishes of Hong Kong. On the botanical side the six following papers on the Hong Kong flora have appeared or are in course of publication : The Orchids, by G. A. C. Herklots ; The Marine Algae, by W. A. Setchell ; Flowering Shrubs and Trees, by G. A. C. Herklots ; The Mosses, by H. N. Dixon ; The Parasitic Mycetozoa, by W. R. Ivimey Cook ; and Balania Harlandii (Hook. f) Van Tiegh. and its relatives, by W. A. Setchell.

The work, which is now under the able and energetic editorship of Dr. G. A. C. Herklots, Reader in Biology in the University of Hong Kong, is well got up and profusely illustrated by drawings and good photographs, whilst a few of the flowers and more than 20 of the birds are portrayed in excellent coloured plates prepared from drawings by Lieut. Commander A. M. Hughes and reproduced by the Cambridge University Press. The numbers issued during the first years of its existence reflect great credit on the Editors and we wish the journal every success.

Flora of the South Indian Hill Stations : Ootacamund, Coonoor, Kotagiri, Kodaikanal, Yercaud and the Country round.†—The author of the " Flora of the Nilgiri and Pulney Hill-Tops," published in two volumes in 1915 with a supplementary one in 1920, has revised and amplified that work under the above title.

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*The Hong Kong Naturalist, edited by G. A. C. Herklots. The Newspaper Enterprise Limited, Hong Kong. Prepaid subscription $7.00 per annum post free ; Europe, 12s. 6d. ; America $3.00 (gold) per annum post free.

†By P. F. Fyson, Principal, Presidency College, Madras. Printed by the Superintendent, Government Press, Madras, 1932, 2 vols. Price Rs. 18.

Though still issued in two volumes (one of text and the other of illustrations), the scope of the work has been extended to include Yercaud in the Shevaroy Hills and Coonoor in the Nilgiris. The same plan is followed, but the number of species of flowering plants included has increased from 483 to 877 and there are 611 full-page plates, which include all but 20 of those in the earlier work and 60 new ones. Many of the descriptions have been revised, the keys to families and genera recast, and all the new species described since 1920 have been included. The taxonomy has, for the most part, been brought into line with those parts of the Flora of the Presidency of Madras that have appeared in the interval. In the Gramineae the author has now split up the genus *Andropogon* (as accepted in the Flora of British India) into some of the genera segregated from it according to modern conceptions. The full division, however, as laid down by Dr. Stapf in the Flora of Tropical Africa, has not been followed ; e.g. *Amphilophis* and *Capillipedium* are omitted and the generic divisions of *Panicum* are not accepted., On page xv appears a list of " Changes in names of genera " from the earlier work, but neither *Parthenocissus* for *Vitis* in part, nor *Moonia* for *Chrysogonum*, is mentioned.

These small inconsistencies, however, detract very little from a work that should prove even more useful and stimulating to both amateur and professional botanists than the now superseded earlier edition. C. E. C. F.

Botanical Magazine.—Part 4 of vol. 156 of the " Botanical Magazine," published on October 2nd, 1933, contains one new species, *Berberis tsarongensis* Stapf (t. 9332), allied to *B. Tischleri* and *B. yunnanensis* and found on the Mekong-Salween divide, N. W. Yunnan, and the following plant portraits :—

Rhododendron megacalyx Balf. f. et Ward (t. 9326), a native of N. E. Burma and S. E. Tibet ; *Cymbidium Devonianum* Paxton (t. 9327), from the Sikkim and Khasia Hills ; *Aeonium manriquerorum* Bolle (t. 9238), one of the Canary Island Sempervivums ; *Clematis ranunculoides* Franch. (t. 9329), an interesting species from northern Yunnan ; *Chrysanthemum Makinoi* Matsumura et Nakai (t. 9330), from Southern Hondo, Japan—the article contains a valuable account by the late Dr. Stapf on the species which have been concerned in the production of the Garden Chrysanthemum ; *Allium Beesianum* W. W. Smith (t. 9331), a fine blue-flowered species from China ; *Iris Helena* K. Koch (t. 9333), from Azerbaijan ; *Cynoglossum amabile* Stapf et Drummond (t. 9334), from China ; *Discaria crenata* Regel (t. 9335), a native of Southern Chile, and *Crossandra subacaulis* C. B. Clarke (t. 9336), a widely distributed perennial in East Africa. The volume is dedicated to Mr. Gerald Loder, and is accompanied by his portrait.

A new Flora of Leicestershire and Rutland.*—Mr. Horwood is to be heartily congratulated on bringing to successful completion a task on which he has been working for so long, but which, owing to various circumstances, had to be finally prepared for press in only eighteen months. The Flora is an attractive volume of nearly a thousand pages, illustrated with portraits, photographs of vegetation, and five maps, including a very valuable coloured geological map of the superficial deposits. Despite its length, the book is not ungainly in size, owing to the judicious use of small print and a sufficiently thin paper.

The arrangement of the matter is planned on a very generous scale. After a Preface giving the origin and history of the work, there follows an introduction of 167 pages, divided into two portions, one on Leicester and the other on Rutland. Under each county there are sections on soils, agriculture, topography, geology, river systems, botanical districts, vegetational types, meteorology and botanical research. While each section is treated very fully, those on botanical districts and vegetational types deserve special mention. The various ecological formations of each district, with full lists of species, are described, special attention being paid to Charnwood Forest and the extensive woodlands of the two counties. The ecological approach to vegetation, so noticeable in the Introduction, is stressed throughout the work, giving it a value not possessed by any other Local Flora.

Before the Flora proper, an enumeration is given of the herbaria, libraries, etc., consulted, followed by a bibliography containing some 200 entries.

The treatment of each species in the body of the work follows the accepted lines, with one notable addition, namely the geological and ecological formations, and soil, in which each species occurs. This information, neatly indicated by symbols, is perhaps the most valuable feature of the Flora and represents the results of Mr. Horwood's extensive ecological surveys over a period of many years. The full lists of localities given for many species which are widely distributed in the two counties are also very valuable, especially as work on the British Flora in the future is likely to be increasingly concerned with autecological and genetical studies of single species or genera, for which such information is particularly useful.

A detailed consideration of the individual species is not possible within the limits of a brief review. When so many are dealt with by a single author it is to be expected that specialists will quarrel with the treatment of particular groups. For example, the nomenclature of the elms, of which Mr. Horwood describes and figures a

*The Flora of Leicestershire and Rutland, a topographical, ecological and historical account with biographies of former botanists (1620–1933), by Arthur Reginald Horwood, F.L.S., and the late Charles William Francis Noel, 3rd Earl of Gainsborough. Oxford University Press, 1933. Pp. ccxciii + 687, illustrated with photographs and maps. Price 35*s*.

new species, *Ulmus elegantissima*, is open to criticism. On the whole, however, a task of considerable taxonomic difficulty has been very ably accomplished, and the notes on general biology after each species are of particular value. Considering the pressure under which the book was seen through the press, the number of misprints is small.

A new Flora of Leicestershire has long been needed and the present volume, which must be regarded as one of the most detailed and comprehensive Local Floras ever published, undoubtedly fills this want with conspicuous success.

Hooker's Icones Plantarum.*—Part 4 of Vol. 2 of the fifth series, which appeared in May 1933, contains descriptions and plates of twenty-five plants, including sixteen new or recently described species, two of which represent new genera.

Ascopholis C. E. C. Fischer (t. 3183) is a cyperaceous genus allied to *Mariscus* and *Ascolepis* ; it is known only from a specimen collected by the late Mr. J. S. Gamble in the Madras Presidency as long ago as 1884. *Thellungia advena* Stapf (t. 3184) was first described from a plant found growing on wool refuse near a mill at Solothurn, Switzerland : the presence of other aliens introduced from Australia led to the suggestion, since proved to be correct, that it came from that country, where it appears to have been confused with *Sporobolus elongatus* R. Br.

Three species of *Ficus* are illustrated and described : *F. glandifera* Summerhayes (t. 3188) from the New Hebrides has receptacles which, with their bracteal cups, bear a striking resemblance to acorns. This feature is less marked in *F. Watkinsiana* F. M. Bailey (t. 3187) from Queensland. *F. nasuta* Summerhayes (t. 3189) is remarkable for the proboscis-like projection of the ostiolar region and its *Tilia*-like leaves ; it is a native of the Santa Cruz Islands (between the New Hebrides and Solomon Islands).

Dorisia Gillespie (t. 3190) is an aberrant new genus of *Cornaceae* from Fiji ; it is related to *Mastixia* Bl. and the recently described *Mastixiodendron* Melch., but differs from both in the absence of a calyx-tube. *Scleria Barteri* Boeck. (t. 3191) is widely spread in dense forest in Tropical Africa from Sierra Leone to Uganda, Pemba Island and the Belgian Congo. It is remarkable among *Cyperaceae* on account of its climbing habit. The stems are sometimes as much as 20 ft. long.

Pavetta uniflora Bremekamp (t. 3194), a native of Kenya Colony, is unusual in the genus on account of its sympodial branching and solitary flowers : bacterial nodules are found in the leaves. *Cryptosepalum pseudotaxus* E. G. Baker (t. 3196) is the dominant tree of

*Hooker's Icones Plantarum; or, figures, with descriptive characters and remarks, of new and rare plants, selected from the Kew Herbarium. Fifth Series. Edited for the Bentham Trustees by Sir A. W. Hill, K.C.M.G., Sc.D., F.R.S., Director, Royal Botanic Gardens, Kew. Vol. 2, Part 4 (London, Dulau & Co., 1933). Price 10*s*.

woodlands on the Kalahari sand in the Mwinilunga District of Northern Rhodesia and eastern Angola. The calyx bears three minute teeth and a single adaxial lobe, and there is but one (adaxial) petal and three stamens. *Blepharis menocotyle* Milne-Redhead (t. 3198), a native of Rhodesia, is of morphological interest because its persistent, crescent-shaped cotyledons form a false whorl with the first pair of foliage leaves. The inflorescence is frequently borne in the axils of this false whorl. The seed appears glabrous when dry, but is really densely covered with appressed hairs which become very conspicuous when it is soaked in water.

Pelargonium frutetorum R. A. Dyer (t. 3200), a species from eastern Cape Province, is related to *P. inquinans* L. and *P. zonale* L., two of the ancestors of our cultivated " geraniums."

The other plants figured are : t. 3176, *Dianthus rupicola* Biv. (Italy, Sicily, Crete) ; 3177, *Rhamnus rhodopeus* Vel. (Bulgaria, Thrace) ; 3178, *Rhamnus rupestris* var. *rumeliacus* Hayek (Thrace) ; 3179, *Teucrium creticum* L. (Asia Minor, Cyprus, Syria, Palestine) ; 3180, *Scilla albanica* Turrill (Albania) ; 3181, *Allium bidentatum* Fisch. (Siberia, China) ; 3182, *Allium Zimmermannianum* Gilg (China) ; 3185, *Pennisetum Basedowii* Summerhayes et C. E. Hubbard (Australia) ; 3186, *Isotoma anethifolia* Summerhayes (Australia) ; 3192, *Hypericum afromontanum* Bullock (East Africa) ; 3193, *Euphorbia Euryops* Bullock (East Africa) ; 3195, *Dombeya brachystemma* Milne-Redhead, sp. nov. (Rhodesia) ; 3197, *Oreacanthus montifuga* Milne-Redhead, sp. nov. (Rhodesia) ; 3199, *Sapium Acetosella*, Milne-Redhead, sp. nov. (Rhodesia).

Dunkal Gum.—This name is applied to one of the bdelliums of British Somaliland, the botanical identity of which was for a long time unknown but has now been shown to be *Commiphora Drake-Brockmanii* Sprague. It differs from the other better known bdelliums and gum-resins from Somaliland in that it is reputed to be exceedingly poisonous. Among the Somalis it is known as " habbak dunkal " and is stated to be utilised by them for poisoning leopards. These animals are said to be the worst enemy of the goat in the colony, and goats are largely kept by the inhabitants (" British Somaliland," R. E. Drake-Brockman). The method of employing the gum-resin is to smear it on a dead goat or other animal which is used as a bait. According to Drake-Brockman the substance is also used medicinally to a certain extent by the Somalis in the treatment of boils and abscesses. A good sample of " habbak dunkal " was recently received at Kew from Mr. Alex. Curle, who is engaged in survey work in the colony. This sample consists for the most part of globular pieces varying in colour with a hard roughened and somewhat cracked exterior. On being fractured the yellow or yellowish-red interior is opaque and dull in appearance. It is bitter to the taste and on being moistened becomes sticky and milky white in colour.

Commiphora Drake-Brockmanii is known to occur in the maritime hills south-east of Berbera and on dry rocky hillsides at Karin (alt. 1100 ft.) where it is common (Collenette). The tree is stated to possess a somewhat gnarled appearance, seldom exceeding 3–4 ft. in height, and to be scantily covered with leaves. Apparently flowers may appear either before or simultaneously with the leaves.

F. N. H.

Shrubs and Trees for the Garden.*—In this book the author makes no attempt to give highly technical descriptions of the shrubs and trees hardy in our gardens, neither has his object been to supply additional knowledge to those people who already know a good deal about the subject. His aim has been to produce a book that will be useful to people who know little about the subject but are fond of trees and want advice upon the many necessary cultural details in clear and concise form, and help in the selection of suitable subjects for different purposes and conditions. The need for such a book is very evident from the number of people who seek advice upon these questions, and that the author has succeeded in his object there can be no gainsaying, for the book is a mine of information concerning trees and shrubs and their requirements. It consists of 35 chapters, 33 of which deal with various phases of cultivation under special headings, such as: trees and shrubs for hedges, catkin-bearing trees and shrubs, trees and shrubs for wind-swept and seaside gardens, berried and fruiting trees and shrubs, climbing shrubs, the heath garden, planting and transplanting, pruning, tree surgery, Japanese dwarf trees, propagation, etc. When necessary, descriptive lists of suitable plants are included in the chapters. There is then a long glossary in alphabetical order describing the necessary technical terms used. Chapter 35, which runs from page 237 to page 566, passes in review a very large number of trees and shrubs, giving useful information about each one. The book is well illustrated, and author and publishers are to be congratulated upon producing a most useful and easily understood book at the modest price of one guinea.

W. D.

I. B. Pole Evans.—In K.B. 1933, 304, line 8, "Doctor of Science" should read "Doctor of Laws."

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